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Original

ILLUMINATING GAS AS A POISONOUS AGENT.*

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It is a noteworthy fact, in human experience, that agencies and forces which have been devised and utilized to promote the most beneficent ends possess at the same time possibilities of the gravest harm. Steam, under subjection, aids in the highest degree in developing industrial progress and enlarging human happiness; but it has within itself a potentiality of destructive mischief which requires vigilant foresight for its control. The mysterious fluid which we call electricity is undergoing the experimental and sometimes crude attempts of man to harness it for the drudgery of daily work; it seems to delight in the sporadic demonstration of its power to shock and to kill without warning.

So, too, the product which the chemist's skill has extracted from two of the most abundant of nature's materials—from coal and from water—and which, if kept in proper submission and properly used, is

an important aid, as illuminating gas, in promoting the welfare and comfort of mankind, has a toxic quality which is truly dangerous and which is becoming recognized as an available means for the accomplishment of evil purposes.

I will consider briefly in this paper the harmful and destructive capability of illuminating gas and the clinical and anatomical data by which that capability is represented.

My attention has been directed to this subject more forcibly by the increasing number of deaths which official investigation has found, in the last four years to be due to the inhalation of illuminating gas. The appended tabular statement of all the deaths from gas-poisoning in the southern district of Suffolk County, which have been called to my notice, as medical examiner, during the past eighteen years, will make this fact of an increasing mortality, from the cause mentioned, more clear:

The manifest difference between the earlier and the later years of the period shown in the table is sufficiently noteworthy to suggest an

*Read before the Norfolk District, Massachusetts Medical Society, February 25, 1896.

inquiry into its cause. I think the explanation is found in two facts: One is that the company which supplies the illuminating gas to Boston consumers distributes at present a more poisonous product than formerly came from the street mains; and the second is that enterprising, but not always discreet, journalism, widely advertises a reliable means of self-destruction every time the details of a suicide by this method are published.

Year.	Suicides.	Accidents.	Totals.
1877	..	..	..
1878	..	2	2
1879	..	..	..
1880	..	..	..
1881	..	1	1
1882	2	..	2
1883	..	..	..
1884	..	..	..
1885	..	1	1
1886	..	..	..
1887	..	..	..
1888	..	1	1
1889	..	1	1
1890	..	4	4
1891	2	1	3
1892	10	5	15
1893	3	3	6
1894	9	9	18
1895	5	9	14
	31	37	68

The sudden rise in the mortality rate in 1892 is something more than a matter of chance; it is coincident with the manufacture and distribution of water gas. Before the change was made a death by coal gas was a rare event, but now the cases are numerous enough to be no longer novel. At present the gas which is supplied represents a mixture of coal gas and water gas in indeterminate proportions.

It is not necessary to the purpose of this paper to describe the processes of the manufacture of the two ordinary kinds of illuminating gas. It is sufficient, if we recognize the element which, found in both products, is an adequate explanation of the symptoms and lethal effects after exposure. Among those who have a right to speak with authority upon this matter there is substantial agreement that of all the constituents found in coal-gas or water-gas carbonic oxide is the one which may claim the distinction of

possessing capacity for the gravest harmfulness. If the other components exercise any influence in a harmful direction it is secondary and remote when compared with the more powerful activity of carbon monoxide.

Now, there is a wide difference in the amount of carbonic oxide which the two compounds, coal gas and water gas, contain. The older form of illuminating gas, made from bituminous coal, is found, on analysis, to consist of hydrogen, marsh gas, olefiant gas and other hydrocarbons, small amounts of carbonic acid gas and air, together with from 4.1-2 to 7.1-2 per cent. of carbonic oxide.

The water gas, on the other hand, consists essentially of hydrogen and carbonic oxide only, the latter constituting from 28 to 40 per cent. of the compound product. As it comes from the retorts water gas is odorless; but as it is delivered to the consumer for illuminating purposes it is not readily to be distinguished from coal gas, for, in order to increase its illuminating properties, it has been mixed with a highly luminous product, made from naphtha, or it has been enriched by the addition of coal gas, made according to the older methods from soft coal.

The only excuse for making and distributing this very poisonous illuminant is the economic excuse—the excuse of thrift. Water gas is four or five times more dangerous to the public than coal gas, but it costs much less in the manufacture; and the custom of combining the two so as to form a compound of greater value for domestic lighting does not materially modify the possibilities for mischief which reside in the undiluted product.

I call attention again to the fact that the introduction of water gas has been followed by a noteworthy increase in the number of carbonic oxide deaths each year since the change. This increase is not a surprise to those who uttered emphatic warnings and publicly prophesied the impending harm when the subject was discussed at the time when a legislative sanction was sought for

the new enterprise of giving our people water gas. Nor can it appear extraordinary when we study the conditions and circumstances usually attending the fatal events.

The most emphatic demonstration of the poisonous properties of the illuminating gas at present supplied to consumers in Boston is found in these same fatal cases, and before alluding to other classes of cases, which are not of this most serious degree, I desire to present a brief review of the data which enable one to make a diagnosis of this cause of death from the anatomical appearances. For this purpose I have selected an example from the considerable number which it has been my privilege to examine at the autopsy table. A single illustration of this sort is quite sufficient, since there is close identity in the post-mortem appearances, and one instance may be taken as a type of which nearly all others of its kind are but duplicates:

John P., a house painter, 57 years old, was sent January 16, 1892, to do some inside work in an unoccupied room which had been leased as a store or office, in the second story of a building the first story of which was used for the sale of clothing. P. was alone at his work until half-past two o'clock in the afternoon, when a gas-fitter went to the place and connected the meter in the hallway with the fixtures in the new store, the supply having been cut off since the place was vacated many weeks before. The gas-fitter's work was finished in half an hour, and at 3 o'clock, having tried the three gas-fixtures and found all of them tight and secure, he left the premises, with P. in sole possession. He was positive that no gas was escaping when he went away.

Three hours and a half later persons passing on the sidewalk outside the building noticed the odor of gas and notified the clothier, who proceeded at once to investigate. He went upstairs, found the door of the room in which the painter had been at work locked on the inside. The odor of gas was very strong in the entry-way. A wrench was found

and the gas supply was shut off at the meter. The door of the room was forced open. It was now after 7 o'clock and quite dark. The room was filled with gas; with commendable presence of mind, the man remembered the danger of explosion present in such a mixture and wisely kept his matches in his pocket. He groped about the room and found the keys at the three bracket fixtures turned on full. The windows in the room were closed. P. was found lying on the floor in the middle of the room, limp and warm, but without sign of life. The interval, then, in which the painter was alone in the room and within which fatal toxic effects followed the inhalation of the gas was four hours; the actual time of exposure was probably shorter.

The autopsy was made thirty-eight hours after the death. External inspection found a diffused fresh pink discoloration of the skin upon the dependent parts, in marked contrast with the usual dull-blue lividities. The face had a fresh color, unlike the commonly-observed cadaveric pallor. The conjunctivae were slightly injected; the corneae were bright. The lips were of a life-like tint. The tongue was within the teeth and not between them. There was a little vomitus on the beard. A slight odor of illuminating gas (naphtha) was exhaled from the body.

The internal examination disclosed characteristic appearances. The muscles had a fresh florid color.

The structure of the heart was normal; the cardiac cavities contained blood of a bright cherry-red color, nearly fluid, but showing a few small, soft, stringy clots. There was no engorgement of the right auricle and ventricle.

The lungs presented the anatomical alterations due to chronic quiescent phthisis, with foci of cheesy degeneration bounded by a periphery of indurated tissue. Both lungs showed the characteristic red color everywhere manifest. There was slight reddening of the bronchial and tracheal mucous membrane, and the air passages contained blood-stained froth. There were no punctate

ecchymoses, either subpleural or subpericardial.

The spleen was large, soft and bright red.

The stomach was empty and of healthy appearance.

The intestines showed a reddening of the mucous membrane in the jejunum and upper part of the ileum.

The pancreas was of a pale reddish color.

The liver contained more than the usual supply of blood, and, like the other organs, had a distinctly heightened color.

The kidneys were injected, slightly above the normal size, and of a cherry-red color. The capsules came away with difficulty and the cut section showed anatomical elements obscurely outlined.

The bladder was empty.

The scalp and skull were intact. The vessels of the pia were injected, and bright-red puncta cruenta appeared abundantly on cut sections of the brain substance.

The case may be regarded as an illustrative example of its entire class. It has the advantage of presenting data as to the time of exposure which are not usually available. The anatomical appearances were characteristic. The one central fact which dominates all the rest is the peculiar change in the blood; this change explains the altered aspect of the tissues and makes manifest the true cause of the death. It is a common custom, both in the profession and among the laity, to speak of these cases as examples of asphyxia or suffocation by the gas. In one sense this is an error; but from another point of view it is scientifically accurate. The fatal consequences of inhaling illuminating gas are not due to any obstruction to the entrance of air to the lungs, such as brings about the phenomena and post-mortem changes ordinarily observed in asphyxia; they are produced rather by genuine toxic effects upon the blood wrought by the introduction, through the respiratory organs, of carbonic oxide to a degree that is incompatible with life. The method by which the fatal result is accom-

plished offers one of the most interesting problems in physiological chemistry. It is so graphically described by Michael Foster (*) that I cannot do better than to transcribe his words: "The red corpuscles, by virtue of their hemoglobin, are emphatically oxygen-carriers. Undergoing no intrinsic change itself, the hemoglobin combines in the lungs with oxygen, which it carries to the tissues; these, more greedy of oxygen than itself, rob it of its charge and the reduced hemoglobin hurries back to the lungs in the venous blood for another portion. * * *

Hemoglobin combines in a wholly similar manner with other gases (besides oxygen). When a known quantity of carbonic oxide gas is sent through a hemoglobin solution, it will be found on examination that a certain amount of the gas has been retained, an equal volume of oxygen appearing in its place in the gas which issues from the solution.*

* * In fact, hemoglobin combines loosely with carbonic oxide, as it does with oxygen; but its affinity with the former is greater than with the latter. While carbonic oxide readily turns out oxygen, oxygen cannot so readily turn out carbonic oxide. Indeed carbonic oxide has been used as a means of driving out and measuring the quantity of oxygen present in any given blood. This property of carbonic oxide explains its poisonous nature. When the gas is breathed the reduced and unreduced hemoglobin of the venous blood unites with the carbonic oxide, and hence the peculiar bright cherry-red color observable in the blood and tissues in cases of poisoning by this gas. The carbonic oxide hemoglobin, however, is of no use in respiration; it is not an oxygen carrier; nay, more, it will not readily, though it does so slowly and eventually, give up its carbonic oxide for oxygen when the poisonous gas ceases to enter the chest and is replaced by pure air. The organism is killed by suffocation, by want of oxygen, in spite of the blood not assuming any dark venous color. As Bernard

* Text-book of Physiology, page 406.

phrased it, 'the corpuscles are paralyzed.'"

Such is the accepted view of the mode in which carbonic oxide kills, whether the source of the gas be in the invisible but useful agent devised for artificial, domestic illumination, or in the slow burning of wood as in buildings on fire, or in the process of smothered combustion carried on in lime kilns, or in the deadly fumes of burning charcoal. Under all these conditions, a sufficiently prolonged inhalation of carbonic oxide gas leads to identical results.

The time required for the fatal consequences in the human subject will vary with all the circumstances under which the exposure occurs. It is a common experience in these cases to find the victim of imprudence or of a suicidal purpose in bed, in a small room, with all chance of a renewal of the air by ventilation through windows, doors or artificial openings obstructed; with the atmosphere of the room fully charged with the gas which is freely escaping at the wide-open key at the fixture.

Sometimes special provision is made to insure successful results.

The first instance of suicide from this cause which came to my notice was that of a man who had removed the perforated tip from the gas fixture in his bed room and in its place had adjusted a piece of rubber tubing long enough to reach the pillow at the head of his bed; having made all the necessary preparations and written his farewell letters he turned on the gas to the fullest, lay down on his bed, inserted the free end of the tube in his mouth, covered his face with several thicknesses of toweling arranged to keep the tube in position, and thus he quickly fulfilled his purpose. In other instances the careful and methodical sealing of all holes and cracks in the bed room is accomplished with paper and mucilage, or cotton, or articles of clothing. But observation of many cases shows that these precautions to prevent interruption and to secure the desired end in suicidal cases are not essential, for the majority of the fatal instances are found without

them. The case reported illustrates the rapidity with which the poisonous gas does its work without special measures to confine it, the entire interval being less than five hours.

That the death is a sure and speedy one under favoring conditions has been demonstrated experimentally. In 1885, the State Board of Health of Massachusetts undertook an investigation of this subject and among other instructive results determined that animals placed in a chamber containing 1140 cubic feet of air space and 55 cubic feet of water gas died after only an hour and a half of exposure.

There is no indication in the attitude or appearance of the bodies of those who have succumbed to carbonic oxide poisoning that there was distress or suffering of any kind in the process. Generally the cases occur at night, when the victim has retired to bed. When discovery of the fact of death is made, the dead body is found in a perfectly natural posture, with the bed clothing in place, an expression on the face as of one asleep, and entire absence of evidence of any consciousness of unpleasant sensations before death.

But it is to be remembered that this record of fatality is not the only evil result for which illuminating gas is responsible. There are many instances of poisoning by this agency wherein the effects stop short of death. These non-fatal cases may be classified as chronic and acute. Of the latter class, numerous single illustrations are afforded in persons, usually domestic servants and uninformed visitors in cities, who on retiring have extinguished the gas light as they would a candle light. They are found in an insensible condition, out of which they are brought with greater or less difficulty according to the extent of their exposure to the carbonic oxide gas. Of this group of patients I do not propose to make further mention in this communication. But I wish to offer as examples of acute poisoning by illuminating gas some facts relating to another variety of casualty.

On several occasions it has been

my fortune to study the effects of the accidental entrance of large volumes of the gas into the air of dwelling houses, in consequence of the breaking of street mains and other similar mishaps, the gas making its way through imperfectly constructed street sewers or untrapped house drains, or sometimes through the ground alone, through the foundations of the dwelling and so becoming diffused throughout the rooms above.

The numerous victims of these accidents lose no time in bringing claims against the gas-light company whose product has wrought the alleged mischief and in an inquiry made at the request of the defendant corporation to determine the validity of the claims presented, I have had the opportunity to study one aspect of the symptomatology of illuminating gas poisoning. These accidents have numbered as victims persons of both sexes and all ages, to the number of 116. A synthesis of the symptoms, as they were derived from the patients themselves or other sources of information, offers a composite picture of the effects resulting from a brief inhalation of the gas. It is to be understood, as a matter of course, that the circumstances under which the exposures occurred necessarily offered some variety in the details of time, quantity of gas inhaled, individual susceptibility, intelligence and disinterestedness; and this want of uniformity is to be borne in mind in any summary of the symptoms recorded. But even with this discount, we may obtain a tolerably satisfactory view of this interesting side of the subject. Placing the symptoms in the order of their reported frequency, they stand as follows:

In the primary group, or those following immediately upon the inhalation of the gas, were nausea and vomiting, nausea without vomiting, dizziness, headache, stupor, mental apathy, insensibility, great weakness, pain in the eyes, diarrhea, a sensation as of smothering, noises in the ears.

In the group of secondary or consecutive symptoms, reported after

varying intervals of time, were the following: Continued headache, weakness and loss of appetite, persistent nausea, pain in the back, bronchitis, continued dizziness, loss of memory.

The cases from which the data of the foregoing summary were derived represented acute poisoning in only a moderate degree of severity; they might be described as sub-acute. In the entire series there was only one group of such gravity as to have any fatal cases, and these, three in number, occurred in a small basement room which received very large volumes of the gas through a defective sink-drain. Generally the exposure was of short duration and the effects consisted of the four nearly constant symptoms, nausea and vomiting, dizziness and headache. The other symptoms were relatively rare. In only 10 of the 116 cases was insensibility observed and in these it was not of long continuance.

It is in the presence of this last mentioned condition only, that of insensibility, that medical aid is imperatively demanded. This condition is the most serious of all the symptoms of gas-inhalation and generally means impending death. The subject of the correct treatment of this alarming condition of coma does not properly come within the scope of this paper. Only the briefest mention, therefore, of the management of these cases will be made. It is evident that if the view of the cause of the symptoms observed be correct, and if it be admitted that carbonic oxide has usurped the place of oxygen in the oxygen-carrying elements of the blood, the rational remedy is a restoration of oxygen to its rightful place in the blood and an overthrow of the usurping poison. To this end the inhalation of oxygen is an obvious aid; and experience confirms its utility. Besides this measure addressed to the poisoned blood through the respiration, other means deserve trial. The condition of the cardiac function is generally alarming and suggests prompt stimulation. To meet this indication Hoffmann, of Baltimore, has used with excellent effect hypodermic injections of

nitro-glycerine in doses of one sixty-fourth of a grain in the precordial region. Others have suggested subcutaneous injections of strychnia. The persistent use of artificial respiration and of the ordinary means for external stimulation will not, of course, be overlooked.

The subject of the more or less remote secondary consequences of acute poisoning by illuminating gas has attracted the attention of scientific students in France and Germany. The reported results of their researches indicate that the individual who survives the insensibility into which his exposure to the gas has brought him has not in that primary recovery escaped all the perils of the emergency. Among these consequential damages are included bronchitis, hemoptysis and pneumonia; persistent headache, mental apathy, neuralgia, paralysis, delirium, cutaneous hyperesthesia and sometimes localized anesthesia, chorea, aphasia and amnesia, and certain trophic disturbances of which herpes, pemphigus and gangrene are examples; diabetes mellitus and albuminuria are also included in the somewhat formidable train of possible consequences. The anatomical changes wrought in the cerebral tissues by carbonic oxide poisoning have been studied by Bouloche (1), Poelchen (2), Simon (3) and Klebs (4). They agree in the observation that the disorders due to lesions in the brain depend upon capillary apoplexies, meningeal hemorrhages and localized softening affecting the motor zones either cortical or deep; and these changes, they declare, are the legitimate effect of carbonic oxide inhalation, acting as a poison on the central nervous system and producing the psychological and neurological phenomena observed clinically. None of these graver consequences of gas-poisoning have been recorded in this country, so far as

I am aware. The only purely psychological effect of acute poisoning which was observed in the series of cases represented in this paper was a loss of memory, the patient in one instance, a young girl of ordinary intelligence, declaring that all the incidents attending and immediately following her accidental exposure to the gas were entirely outside her memory, although her behavior at the time seemed to her neighbors and kindred perfectly natural.

This study of the poisonous effects of illuminating gas upon the human system will be incomplete without an allusion to another aspect of the subject. I refer to what may be described as chronic poisoning from this source; and I mean by this the consequences of a prolonged exposure to an atmosphere containing a small but appreciable contamination by coal gas or water gas. These consequences are not demonstrable; but they are intelligible and credible. The air of an ill-ventilated room into which, continuously, there is escaping from defective piping-joints or leaking fixtures a steady stream, however small, of carbonic oxide urged forth under pressure, is not without a menace to health. This state of things is common enough in well-ordered dwellings; it is much more common in the tenements and workshops of the poor, who pay rent to landlords who are slow and careless in making repairs. The habitual use of such an atmosphere for purposes of respiration must, one would think, inevitably make an unfavorable impression on the health of the person exposed. May we not find in it one of the factors in the etiology of the headaches, the neuralgias, the loss of appetite, the debility, the gastric derangements which we are too ready to diagnose comprehensively and hastily as neurasthenia, but which are only an expression of chronic poisoning by carbonic oxide?

The preventive remedy for the ills and risks considered in this paper is plain. It consists in the rejection of water-gas and coal-gas, as far as is practicable, from the class of agencies for artificial illumination. Human ingenuity will find the sub-

(1) Archives de Neurologie, September, 1890.

(2) Archiv f. Pathol. Anatomie, Bd. xcii.

(3) Archiv f. Psychiatrie Bd. i, s. 260.

(4) Virchow's Archiv. Bd. xxxii.

stitute which will replace this useful but dangerous product. The favorite illuminant of the twentieth century will be electricity, an agent which does not introduce itself to notice by a vile stench; which does not carry a menace of death into every sleeping room, and make easy victims of the heedless; which does not lend itself to the purpose of the suicide; which does not waste and heat and vitiate the air while

doing service in illumination; which is clean, wholesome and cheerful. Such a domestic servant is to be welcomed, and the herald of sanitary progress will not fail to appreciate the great gain to the public health which will follow the general introduction of the incandescent system of electric lighting into our dwellings at such reasonable rates as to compete successfully with illuminating gas.

POISONOUS EFFECTS OF CARBONIC OXIDE IN ILLUMINATING AND OTHER GASES.*

BY J. A. TANNER, M. D., BOSTON, MASS.

As time passes and the years grow in number, bringing increased improvements in the arts and many scientific discoveries adapted to the uses of man for convenience and comfort, lessening the labor of nearly all classes, the professional as well as the laboring, the already overtaxed physician is called upon to prepare himself, owing to these very improvements, to meet with new problems and be constantly equipped to face a class of emergencies that strain his mental faculties and often tax his physical powers.

Strokes of lightning have been the cause at rare intervals for some physician to use his skill upon a patient suffering from the effects of electricity but in this day, when electricity is being so generally used, as a source for light and a power for propelling street cars and light machinery, such demands for the physician's skill are not so rare, and with every care in the handling of this agent, these calls must become more frequent as the use of this source of energy is extended.

Since the introduction of coal gas for general illumination in the early part of this century, when the streets of London were first lighted by it, cases of poisoning from the inhalation of the escaping gas have been quite frequent, and the frequency of the cases has grown as improvements in the process of manufacture have lowered the price and admitted of a more general use.

Of recent years science has made practical the manufacture of the so-called water gas, which is almost as old as coal gas; and has still further reduced the price and extended the use of gas, not only as an illuminant, but also as a fuel for cooking; and judging from the present signs, the time is not very distant when the price will be so lowered as to admit of gas being used as a general fuel, even supplanting coal for heating our houses. With the introduction of this water gas there has been a great increase in the number of cases of gas poisoning, due in some measure to the increased consumption, but especially to the nature of this gas, water gas being much more poisonous than coal gas and more liable to escape, requiring very close joints in the pipes and fixtures used in conveying it.

In order to more fully understand the difference between these two gases, it will probably not be out of place to give a brief view of the processes of manufacture.

Coal gas is made by the destructive or dry distillation of some form of bituminous coal, the coal being heated in closed retorts to drive off volatile matter, while coke remains in the retort.

Upon the management of the heat used, as to intensity, and the rapidity or slowness of the process, the amount and nature of the gas depends, especially as to richness in illuminating power. The gas carries with it from the retorts a number of by-products which must be removed

*Read before the Norfolk District, Massachusetts Medical Society.

in the purifying; some of these by-products, as coal tar and ammonia, are valuable, while others, as carbonic acid, sulphuretted hydrogen, sulphur, etc., are useless and harmful.

The water gas process consists in having a large upright, fire-brick lined iron generator, so constructed as to admit of anthracite coal or coke being placed in the lower part and brought to nearly a white heat, when water in the state of steam is blown through. In the presence of this highly heated mass of carbon a decomposition of the steam takes place, the ultimate elements of the water, hydrogen and oxygen, are set free and proceed to form new combinations, a little of the hydrogen taking up carbon to form carburetted hydrogen, the greater part going off free, while the oxygen as it first comes in contact with the incandescent carbon, and is present in sufficient quantity for complete combustion to occur, forms carbon dioxide; but this carbon dioxide being surrounded by a surplus of red-hot carbon, is changed to carbon monoxide. The highly heated carbon by extracting from the carbon dioxide one atom of oxygen changes it to carbon monoxide, while with the stolen atom of oxygen the carbon forms another molecule of carbon monoxide, hence the oxygen present in the steam passes off almost entirely in combination with the carbon as carbonic oxide, the result always of the incomplete combustion of carbon.

The mixture of gases so far produced is known as the "body gas," and consists of marsh gas, carbonic oxide and hydrogen, with a little carbon dioxide, sulphuretted hydrogen, etc. This "body gas" burns with a blue flame and has but feeble illuminating property, requiring to be enriched in order to burn with a white flame for illumination.

The enriching or carburetting, as it is sometimes called, is carried out in the upper part of the generator or in separate retorts, by pumping in crude petroleum or some of its products rich in carbon, such as crude naphtha. The intense heat of the chamber decomposes this crude oil into permanent gases, especially the

heavy hydrocarbon gases, known as illuminants, which mixes with the body gas, and the entire volume of gases is conducted off to be purified and stored for use. The process is not a continuous one, as during the introduction of steam when gas is actually made, the temperature of the mass of carbon is soon lowered below the point for the decomposition of the water, so the gas made is conducted away when that point is reached; the conduits are then closed and the generator opened at the top to the air; then air is blown through the mass from the bottom to get up the necessary heat again and soon. There are no by-products of value.

The candle power of coal gas depends upon the quality of the coal used and the care taken in the distillation, while the candle-power of water gas is dependent upon the amount and nature of the crude petroleum or naphtha used in the enrichment.

There exists a very general and quite erroneous idea that water gas is odorless; the body gas may have but little odor, but considering the odoriferous material used to enrich it, the finished product must have odor, and to my sense of smell water gas has a far more disagreeable, penetrating and lingering odor than coal gas.

There is a considerable difference in the composition of these two gases, and it is here we can look for the positive cause of the great increase in the number of cases of gas poisoning and the greater fatality attending them, since the introduction of what the gas engineers call the "New Process Gas." For the purpose of comparison the Massachusetts State Inspector's reports will be used, giving an analysis of the coal gas used in Boston some years ago, and of the water gas used at the present time:

	Coal Gas.	Water Gas.	Water Gas.
Illuminants ...	6.19	16.59	14.39
Marsh gas.....	35.77	19.78	23.43
Hydrogen	49.39	32.07	31.20
Carbonic oxide. .	6.70	26.10	29.30
Nitrogen	1.37	2.42	1.34
Oxygen .....	.03	.00	.03
Carbonic acid ..	.35	3.04	.31
	100.00	100.00	100.00

In the manufacture of either gas there is a variation in the finished product from day to day or even hour to hour, but the variation is not very great, so the figures obtained by an analysis at any time represent quite well the general composition of the gas. In the analysis here given special notice is called to the fact that the illuminants are present in the water gas to nearly three times the amount in the coal gas, and the carbonic oxide is more than four times abundant. If we deduct a conclusion upon the basis of the relative amounts of the poisonous carbonic oxide present, it would seem that water gas is four times as poisonous as coal gas, but, judging from experiments upon the lower animals and from actual cases of poisoning, water gas appears to be more fatal than in this ratio.

The injurious quality of either gas is generally considered to be due almost entirely to the presence of carbonic oxide, the other ingredients acting only as negative poisons, in that they do not support respiration and by their presence diminish the supply of oxygen.

Feeble poisoning qualities are attributed to marsh gas by some writers, but in consideration of the fact that since the introduction of the safety lamp to prevent explosions in mines, miners can work where this gas is present in mixture with the air in more than explosive quantities, and feel no bad effect from respiring it, the presence of marsh gas can hardly be considered as a factor in cases of poisoning from illuminating gas.

The illuminants, consisting chiefly of olefiant gas, with small amounts of acetylene and other heavy hydrocarbons, are not looked upon as poisonous, but it is by no means positive that they are harmless, and it may be that the large amount of these in water gas may have something to do with rendering this gas more poisonous than the proportional increase of the carbonic oxide over that of coal gas.

There is no question that carbonic oxide is a very active and fatal nar-

cotic poison when respired in sufficient quantity, and experiments on the lower animals point to 0.5 per cent. as the maximum amount of this gas to be present to reach the danger limit. Actual cases of poisoning show also that the presence of this amount will prove fatal, since deaths have occurred from the continued breathing of a mixture of coal gas and air, where the gas was present to an extent less than 9 per cent., for at about this amount the mixture becomes explosive, but in the room where the poisoning occurred a candle had burned out and a stove had a live fire in it, still there had been no explosion; consequently, upon the basis that 8 per cent. of coal gas was present, 6.5 per cent. of which was carbonic oxide, a simple calculation would give 0.52 per cent. as the actual percentage of carbonic oxide present.

Carbonic oxide, when breathed into the lungs, passes into the blood by absorption and immediately enters upon its destructive work by attacking this vital fluid in such a manner as to paralyze its red corpuscles. The hemoglobin of the blood possesses the power of readily taking up oxygen and of as freely giving it off again, but when carbonic oxide is respired the oxygen, in loose combination with the hemoglobin, is displaced by the carbonic oxide to form carbonic oxide-hemoglobin, which by its presence destroys the respiratory function of the blood, for it can then neither take up oxygen from the lungs nor give it off to the tissues.

This carbonic oxide-hemoglobin turns the blood to a bright red color, which lingers for some time. It is quite a stable compound, so stable that oxygen has but little power to break it up and drive off the carbonic oxide in order to resume its important function; hence the reason that artificial respiration is so inefficient in these cases of poisoning, and that the resuscitation of them is so difficult.

Knowing that the continued respiration of a mixture of gases containing only one-half per cent. of carbonic oxide will prove fatal, it is reasonable to conclude that the continued

breathing of even much smaller amounts will give injurious effects. It is claimed that the odor of coal gas is perceptible when only 1-1000 part is present in the air, and it scarcely seems possible that this small amount could give sufficient carbonic oxide to produce any appreciable result, but in consideration of the peculiar action and extreme poisonous quality of this gas, the day after day respiration of any amount, however small, must in time produce some effect; and there can be but little doubt that many persons have suffered from a kind of chronic poisoning, due to leaks of illuminating gas so slight as to be considered harmless. When this gas gets into the house from leaks in the street mains, in its passage through the earth, the illuminants, the odoriferous constituent, are reduced in amount and often to a considerable extent, with no corresponding decrease of the carbonic oxide, and then it is possible for this deodorized gas to accumulate almost to the danger limit without the presence of it being made known by its odor. Under these circumstances, especially during the winter season, when the houses are kept closed, we may meet with troublesome and puzzling cases and not be able to trace the cause, even if it is suspected.

Poisoning from the fumes of burning charcoal partakes very much of the nature of coal or water gas poisoning, since charcoal fires are not usually very brisk, but are more of the nature of smoldering fires, which give off considerable quantities of carbonic oxide. One observer makes the statement that the fumes from a vividly burning charcoal fire contain about 11 per cent. of carbonic oxide, and about 14 per cent. when the fire is nearly extinguished. Another observer states it has been shown that these fumes contain from 2 to 3 per cent. of carbonic oxide and about 25 per cent. of carbonic acid. There is quite a difference in these two statements.

Now, as to the amount of carbonic acid there must be in mixture with the air, to give fatal results, there is again a wide difference of opinion;

one statement being that it is generally considered an atmosphere containing 10 per cent. of this gas will prove rapidly fatal and that an air containing only 2 per cent. cannot be breathed any length of time with impunity. Another statement is to the effect that a mixture of one part of carbonic acid and three parts of air produced in man but slight discomfort after being breathed for some time. Again, those who at one time used mixtures of carbonic acid and air for anesthetic purposes have stated that air containing 20 per cent. carbonic acid may be breathed without injurious effects.

There is such a wide difference of opinion upon these important points it is not possible to settle upon any definite figures, and as usual where expert medical testimony is to guide, the question must be left to you gentlemen, as to the jury, to draw your own conclusions.

The claim is made that the mixture of the two gases is more fatal than either gas separately, and this seems to be in accordance with experimental results and cases of actual poisoning. To illustrate this, an experiment with the comment on the results will be quoted in full:

"The vapor from some fully ignited fuel was conducted into a closed space in which there was a middle-sized dog whose condition could be watched. In ten minutes the animal fell exhausted, and in 20 minutes it died after some hard breathing. A candle burnt with its usual brightness in the closed room, and it was only ten minutes after the death of the dog that the flame of the candle, from becoming paler and paler was extinguished. The air of the chamber was at this time collected and analyzed. It contained in 100 parts: Carbonic acid, 4.61; carbonic oxide, 0.54; carburetted hydrogen, 0.04; oxygen, 19.19, and nitrogen, 75.62. It would thus appear that less than 5 per cent. of carbonic acid is fatal to life when so little as 1-2 per cent. of carbonic oxide is mixed with it. The burning of a candle under the circumstances will also show that oxy-combustion may be maintained in a mixture by which an animal is killed,

stitute which will replace this useful but dangerous product. The favorite illuminant of the twentieth century will be electricity, an agent which does not introduce itself to notice by a vile stench; which does not carry a menace of death into every sleeping room, and make easy victims of the heedless; which does not lend itself to the purpose of the suicide; which does not waste and heat and vitiate the air while

doing service in illumination; which is clean, wholesome and cheerful. Such a domestic servant is to be welcomed, and the herald of sanitary progress will not fail to appreciate the great gain to the public health which will follow the general introduction of the incandescent system of electric lighting into our dwellings at such reasonable rates as to compete successfully with illuminating gas.

POISONOUS EFFECTS OF CARBONIC OXIDE IN ILLUMINATING AND OTHER GASES.*

BY J. A. TANNER, M. D., BOSTON, MASS.

As time passes and the years grow in number, bringing increased improvements in the arts and many scientific discoveries adapted to the uses of man for convenience and comfort, lessening the labor of nearly all classes, the professional as well as the laboring, the already overtaxed physician is called upon to prepare himself, owing to these very improvements, to meet with new problems and be constantly equipped to face a class of emergencies that strain his mental faculties and often tax his physical powers.

Strokes of lightning have been the cause at rare intervals for some physician to use his skill upon a patient suffering from the effects of electricity but in this day, when electricity is being so generally used, as a source for light and a power for propelling street cars and light machinery, such demands for the physician's skill are not so rare, and with every care in the handling of this agent, these calls must become more frequent as the use of this source of energy is extended.

Since the introduction of coal gas for general illumination in the early part of this century, when the streets of London were first lighted by it, cases of poisoning from the inhalation of the escaping gas have been quite frequent, and the frequency of the cases has grown as improvements in the process of manufacture have lowered the price and admitted of a more general use.

Of recent years science has made practical the manufacture of the so-called water gas, which is almost as old as coal gas; and has still further reduced the price and extended the use of gas, not only as an illuminant, but also as a fuel for cooking; and judging from the present signs, the time is not very distant when the price will be so lowered as to admit of gas being used as a general fuel, even supplanting coal for heating our houses. With the introduction of this water gas there has been a great increase in the number of cases of gas poisoning, due in some measure to the increased consumption, but especially to the nature of this gas, water gas being much more poisonous than coal gas and more liable to escape, requiring very close joints in the pipes and fixtures used in conveying it.

In order to more fully understand the difference between these two gases, it will probably not be out of place to give a brief view of the processes of manufacture.

Coal gas is made by the destructive or dry distillation of some form of bituminous coal, the coal being heated in closed retorts to drive off volatile matter, while coke remains in the retort.

Upon the management of the heat used, as to intensity, and the rapidity or slowness of the process, the amount and nature of the gas depends, especially as to richness in illuminating power. The gas carries with it from the retorts a number of by-products which must be removed

*Read before the Norfolk District, Massachusetts Medical Society.

in the purifying; some of these by-products, as coal tar and ammonia, are valuable, while others, as carbonic acid, sulphuretted hydrogen, sulphur, etc., are useless and harmful.

The water gas process consists in having a large upright, fire-brick lined iron generator, so constructed as to admit of anthracite coal or coke being placed in the lower part and brought to nearly a white heat, when water in the state of steam is blown through. In the presence of this highly heated mass of carbon a decomposition of the steam takes place, the ultimate elements of the water, hydrogen and oxygen, are set free and proceed to form new combinations, a little of the hydrogen taking up carbon to form carburetted hydrogen, the greater part going off free, while the oxygen as it first comes in contact with the incandescent carbon, and is present in sufficient quantity for complete combustion to occur, forms carbon dioxide; but this carbon dioxide being surrounded by a surplus of red-hot carbon, is changed to carbon monoxide. The highly heated carbon by extracting from the carbon dioxide one atom of oxygen changes it to carbon monoxide, while with the stolen atom of oxygen the carbon forms another molecule of carbon monoxide, hence the oxygen present in the steam passes off almost entirely in combination with the carbon as carbonic oxide, the result always of the incomplete combustion of carbon.

The mixture of gases so far produced is known as the "body gas," and consists of marsh gas, carbonic oxide and hydrogen, with a little carbon dioxide, sulphuretted hydrogen, etc. This "body gas" burns with a blue flame and has but feeble illuminating property, requiring to be enriched in order to burn with a white flame for illumination.

The enriching or carburetting, as it is sometimes called, is carried out in the upper part of the generator or in separate retorts, by pumping in crude petroleum or some of its products rich in carbon, such as crude naphtha. The intense heat of the chamber decomposes this crude oil into permanent gases, especially the

heavy hydrocarbon gases, known as illuminants, which mixes with the body gas, and the entire volume of gases is conducted off to be purified and stored for use. The process is not a continuous one, as during the introduction of steam when gas is actually made, the temperature of the mass of carbon is soon lowered below the point for the decomposition of the water, so the gas made is conducted away when that point is reached; the conduits are then closed and the generator opened at the top to the air; then air is blown through the mass from the bottom to get up the necessary heat again and soon. There are no by-products of value.

The candle power of coal gas depends upon the quality of the coal used and the care taken in the distillation, while the candle-power of water gas is dependent upon the amount and nature of the crude petroleum or naphtha used in the enrichment.

There exists a very general and quite erroneous idea that water gas is odorless; the body gas may have but little odor, but considering the odoriferous material used to enrich it, the finished product must have odor, and to my sense of smell water gas has a far more disagreeable, penetrating and lingering odor than coal gas.

There is a considerable difference in the composition of these two gases, and it is here we can look for the positive cause of the great increase in the number of cases of gas poisoning and the greater fatality attending them, since the introduction of what the gas engineers call the "New Process Gas." For the purpose of comparison the Massachusetts State Inspector's reports will be used, giving an analysis of the coal gas used in Boston some years ago, and of the water gas used at the present time:

	Coal Gas.	Water Gas.	Water Gas.
Illuminants ...	6.19	16.59	14.39
Marsh gas.....	35.77	19.78	23.43
Hydrogen	49.39	32.07	31.20
Carbonic oxide.	6.70	26.10	29.30
Nitrogen	1.37	2.42	1.34
Oxygen .....	.03	.00	.03
Carbonic acid ..	.55	3.04	.31
	100.00	100.00	100.00

In the manufacture of either gas there is a variation in the finished product from day to day or even hour to hour, but the variation is not very great, so the figures obtained by an analysis at any time represent quite well the general composition of the gas. In the analysis here given special notice is called to the fact that the illuminants are present in the water gas to nearly three times the amount in the coal gas, and the carbonic oxide is more than four times abundant. If we deduct a conclusion upon the basis of the relative amounts of the poisonous carbonic oxide present, it would seem that water gas is four times as poisonous as coal gas, but, judging from experiments upon the lower animals and from actual cases of poisoning, water gas appears to be more fatal than in this ratio.

The injurious quality of either gas is generally considered to be due almost entirely to the presence of carbonic oxide, the other ingredients acting only as negative poisons, in that they do not support respiration and by their presence diminish the supply of oxygen.

Feeble poisoning qualities are attributed to marsh gas by some writers, but in consideration of the fact that since the introduction of the safety lamp to prevent explosions in mines, miners can work where this gas is present in mixture with the air in more than explosive quantities, and feel no bad effect from respiring it, the presence of marsh gas can hardly be considered as a factor in cases of poisoning from illuminating gas.

The illuminants, consisting chiefly of olefiant gas, with small amounts of acetylene and other heavy hydrocarbons, are not looked upon as poisonous, but it is by no means positive that they are harmless, and it may be that the large amount of these in water gas may have something to do with rendering this gas more poisonous than the proportional increase of the carbonic oxide over that of coal gas.

There is no question that carbonic oxide is a very active and fatal nar-

cotic poison when respired in sufficient quantity, and experiments on the lower animals point to 0.5 per cent. as the maximum amount of this gas to be present to reach the danger limit. Actual cases of poisoning show also that the presence of this amount will prove fatal, since deaths have occurred from the continued breathing of a mixture of coal gas and air, where the gas was present to an extent less than 9 per cent., for at about this amount the mixture becomes explosive, but in the room where the poisoning occurred a candle had burned out and a stove had a live fire in it, still there had been no explosion; consequently, upon the basis that 8 per cent. of coal gas was present, 6.5 per cent. of which was carbonic oxide, a simple calculation would give 0.52 per cent. as the actual percentage of carbonic oxide present.

Carbonic oxide, when breathed into the lungs, passes into the blood by absorption and immediately enters upon its destructive work by attacking this vital fluid in such a manner as to paralyze its red corpuscles. The hemoglobin of the blood possesses the power of readily taking up oxygen and of as freely giving it off again, but when carbonic oxide is respired the oxygen, in loose combination with the hemoglobin, is displaced by the carbonic oxide to form carbonic oxide-hemoglobin, which by its presence destroys the respiratory function of the blood, for it can then neither take up oxygen from the lungs nor give it off to the tissues.

This carbonic oxide-hemoglobin turns the blood to a bright red color, which lingers for some time. It is quite a stable compound, so stable that oxygen has but little power to break it up and drive off the carbonic oxide in order to resume its important function; hence the reason that artificial respiration is so inefficient in these cases of poisoning, and that the resuscitation of them is so difficult.

Knowing that the continued respiration of a mixture of gases containing only one-half per cent. of carbonic oxide will prove fatal, it is reasonable to conclude that the continued

breathing of even much smaller amounts will give injurious effects. It is claimed that the odor of coal gas is perceptible when only 1-1000 part is present in the air, and it scarcely seems possible that this small amount could give sufficient carbonic oxide to produce any appreciable result, but in consideration of the peculiar action and extreme poisonous quality of this gas, the day after day respiration of any amount, however small, must in time produce some effect; and there can be but little doubt that many persons have suffered from a kind of chronic poisoning, due to leaks of illuminating gas so slight as to be considered harmless. When this gas gets into the house from leaks in the street mains, in its passage through the earth, the illuminants, the odoriferous constituent, are reduced in amount and often to a considerable extent, with no corresponding decrease of the carbonic oxide, and then it is possible for this deodorized gas to accumulate almost to the danger limit without the presence of it being made known by its odor. Under these circumstances, especially during the winter season, when the houses are kept closed, we may meet with troublesome and puzzling cases and not be able to trace the cause, even if it is suspected.

Poisoning from the fumes of burning charcoal partakes very much of the nature of coal or water gas poisoning, since charcoal fires are not usually very brisk, but are more of the nature of smoldering fires, which give off considerable quantities of carbonic oxide. One observer makes the statement that the fumes from a vividly burning charcoal fire contain about 11 per cent. of carbonic oxide, and about 14 per cent. when the fire is nearly extinguished. Another observer states it has been shown that these fumes contain from 2 to 3 per cent. of carbonic oxide and about 25 per cent. of carbonic acid. There is quite a difference in these two statements.

Now, as to the amount of carbonic acid there must be in mixture with the air, to give fatal results, there is again a wide difference of opinion;

one statement being that it is generally considered an atmosphere containing 10 per cent. of this gas will prove rapidly fatal and that an air containing only 2 per cent. cannot be breathed any length of time with impunity. Another statement is to the effect that a mixture of one part of carbonic acid and three parts of air produced in man but slight discomfort after being breathed for some time. Again, those who at one time used mixtures of carbonic acid and air for anesthetic purposes have stated that air containing 20 per cent. carbonic acid may be breathed without injurious effects.

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The claim is made that the mixture of the two gases is more fatal than either gas separately, and this seems to be in accordance with experimental results and cases of actual poisoning. To illustrate this, an experiment with the comment on the results will be quoted in full:

"The vapor from some fully ignited fuel was conducted into a closed space in which there was a middle-sized dog whose condition could be watched. In ten minutes the animal fell exhausted, and in 20 minutes it died after some hard breathing. A candle burnt with its usual brightness in the closed room, and it was only ten minutes after the death of the dog that the flame of the candle, from becoming paler and paler was extinguished. The air of the chamber was at this time collected and analyzed. It contained in 100 parts: Carbonic acid, 4.61; carbonic oxide, 0.54; carburetted hydrogen, 0.04; oxygen, 19.19, and nitrogen, 75.62. It would thus appear that less than 5 per cent. of carbonic acid is fatal to life when so little as 1.2 per cent. of carbonic oxide is mixed with it. The burning of a candle under the circumstances will also show that oxy-combustion may be maintained in a mixture by which an animal is killed,

and therefore that combustion can furnish no criterion of safety in apartments in which charcoal has been burnt."

It seems to me that when the dog died the mixture of gases in the chamber contained even smaller quantities of carbonic oxide and carbonic acid than the analysis gave, for this was not made until the candle was extinguished, ten minutes later; during which time the air must have become more and more contaminated, finally putting the candle out. To take the figures as they stand the mixture of one-half per cent. carbonic oxide and 4.6 per cent. of carbonic acid gave more rapid results than would be expected from such a percentage of either gas separately, especially when the oxygen was so slightly reduced, 19.19 per cent. as compared to 20.81 per cent., the normal amount in the air.

Bearing in mind the results of the experiment and the inference drawn from it, we will now consider the ordinary house furnace as a source of poisoning from gases.

The furnace fire as arranged for the night is a good example of a smothered fire, where the supply of oxygen is limited in order to have slow combustion, and the incomplete combustion of some of the carbon with the production of carbonic oxide must follow as a result. The average servant and kid-glove furnace stoker considers it especially necessary to close the chimney damper in order to lessen the draught when the fire is banked for the night. By this proceeding the gaseous products of the smoldering fire are cut off almost

entirely from the chimney, and are pent up in the fire chamber, to leak out through faults or cracks and pass into the flues; in the case of the carbonic oxide gas, even if there are no faults or cracks, it has the power of passing through the pores of heated cast iron, and by this means will reach the flue chamber. Hence on cold nights, when the heat of the furnace is all turned into the flues leading to the sleeping chambers, a faulty furnace may prove the cause of active gas poisoning, and such cases are now and then reported.

We at times meet with patients who sleep well, in fact are rather sound sleepers, but get no restful benefit from it, getting up in the morning feeling tired, drowsy and dull; they complain of a slight headache of nausea sometimes, and of having no appetite for breakfast; they also have a somewhat sallow and anemic complexion. After moving around the house awhile or getting out in the fresh air, these patients feel better and by bed time are quite fresh again, but the next morning finds them repeating the old story.

Have the gases from the mismanaged or faulty furnaces anything to do with these cases? We know that a slight leak of illuminating gas will give a chronic poisoning with a similar train of symptoms.

The question is a new one to me and having raised it, I shall feel justified hereafter, when such cases are met with, to add to my irregular professional duties that of an inspector of furnaces and banked furnace fires.

VASCULAR MOBILITY AND STASIS, INTERRUPTION, ARREST AND RESTORATION OF THE SANGUINOUS WAVE, PHYSIOLOGICAL AND PATHOLOGICAL

BY THOMAS H. MANLEY, M. D., NEW YORK.

VASCULAR STASIS.

Vascular stasis is a physiological and pathological condition. Besides, it may be artificially induced.

When it is gradually induced from whatever cause, and without injury to the integrity of the larger vessels, an organ or structure will endure

moderate or complete arrest of the circulation over many hours, or even days, without serious detriment. Under the microscope we may easily observe a delayed, interrupted arrested motion in many of the capillaries.

While the animal is being manacled, we may notice that while under

the influence of fear, or emotion, no blood flows, except in the larger capillaries; though after a brief period active movements again begin.

Under intense cold the circulation in the exposed parts at first is languid, the larger capillaries become widely distended, imparting to the interment a red glow. This is attended with hyperaesthesia and pain. When the parts are still exposed to a further sinking of the temperature, sensation becomes blunted, and the bright red surface color is replaced by a dull gray, ashy hue. Now vascular stasis is complete, and the corpuscular elements of the blood are congealed. The thermal stasis of the vascular elements of organized bodies is a subject of great interest to the student of natural phenomena and points to the wide difference of the effects of extremes of temperature, of cold and heat; we are reminded by it that a part may be frozen through and through and yet preserve its vitality quite unimpaired. There has been no elementary disorganization; the protoplasmic corpuscles, the living matter, yet maintains its vitality unimpaired, and the being or structure may yet be reanimated or revived. The blood preserves its vitality for various periods, under congealation from frost, or intense cold, according to the age and constitution of the animal, its modes of existence, and the circumstances under which the freezing has been borne.

Prudden found that many varieties of bacteria might be solidly frozen in ice-cakes, without their vitality being destroyed. And, so likewise, we may thrust the frog's feet into a freezing mixture of ice and salt, allowing it to remain immersed until a spur may be broken off, as a pipe-stem, yet, when we are cautious to gradually raise the temperature of the part, allowing the animal to remain in cold water for about six hours, we can once more see the blood moving under the thickened edematous derma, in the larger vessels. The vitality of the blood is enormously influenced by the state of the digestive organs. For instance, in hypostatic congestion of the per-

ipheral vessels in structures the farthest from the heart, when one is under the influence of intense cold, provided the animal be abundantly nourished with appropriate food, great resistance is provided against progressive destruction; while on the contrary with the under-fed, the out-cast or tramp, death or gangrene of a part frequently speedily follows a severe frost bite.

In the historic campaign of 1812, on Napoleon's retreat from Moscow, although the rigors of that winter are said to have been no greater than they usually are in Russia, the mortality from low temperature and exposure was enormous on both sides; in consequence of the reduced vitality of the troops, from insufficient or improper food. Vigorous cardiac action, an abundance of the hydrocarbons with ample exercise, will enable one to resist that vascular stasis of the extremities so fatal to their integrity, when exposed to the depressing influence of severe or protracted frost.

FRIGO STASIS AND THERMOSTASIS.

Cold is a most patent haemostatic agent; one which has as much wider range of application and safer than heat.

Cold acts only indirectly, when so employed, in most cases. Its primary influence is on the nervous system, when, by reflex action through the vaso-motor nerves, the pericapillary tissues are stimulated to contract. We often read of "capillary contraction," but this is certainly a mistake, inasmuch as there is no muscular tissue in their walls. I am rather inclined to believe that when cold is employed, for deep-seated hemorrhage, as from an internal organ as the lung, stomach or uterus, its salutary effects follow, rather from its depressive action on the heart, than directly on the vessels. In post-partem hemorrhage, in vesical hematuria, hematamesis, rectal hemorrhage or bleeding from any denuded surface; when crushed ice or ice water is applied, its action is physical or mechanical. Applied to a raw surface, the chill arouses a contraction of in all the adjacent soft parts; besides it tends to produce a

thickening and coagulation of the blood in all the finer vessels.

Until recent years cold was the main reliance of the surgeon in all parenchymatous bleedings, in the excision of tumors, resections and amputations.

Of late year, however, thermostasis has come to generally displace it, under many circumstances, I believe, to the disadvantage of the patient. Heat is unquestionably the most potent and positive of all the hemostatics; but like all powerful agents it has serious drawbacks. If not used with caution and discrimination it may work serious evil. In 1879, Emmet, of New York, reported on the great value of heat as a hemostatic in intrauterine hemorrhage, particularly, post-partum. Somewhat later, Paquelin invented his invaluable thermo-cautery and contemporaneously the Germans began to experiment with electro-cautery in surgery.

The potential cautery, we all know, antedated Pare's ligation of the arteries. Before this time, in amputations, the large cautery iron was em-

ployed to close the vessels and char the tissues in amputations. In some cases the ancients employed boiling olive oil as the milder agent.

Then, ligation came, and the potential cautery was cast aside, to be revived again after an interval of more than three centuries.

The late Mr. Keith, whose large experience and great successes in the removal of uterine fibroids have been unequaled, realized his unique operative results through radical hemostasis, which he always secured by the employment of the large cautery irons which bear his name. The ultimate course of his patients, however, was not satisfactory. Adhesion followed. The sharp reactory inflammation in the delicate peritoneal tissues welded everything together in one mass. Vesical tenesmus, intestinal colic and mechanical constipation: succeeding, left many of his patients in a more distressed plight than before surgery was invoked. So deplorable, indeed were the after-results that this great surgeon was among the first to hail with delight the Apostolli method of electrization of pelvic tumors.

L'ONANISME CHEZ LA FEMME.

BY DR. POUILLET, FRANCE.

Translated from the sixth edition by Dr. F. E. Chandler.

(Continued from last Number)

CHAPTER V.

(Continued.)

Masturbation does not always invariably produce the disorders we have mentioned, but in incorrigible cases it causes, almost inevitably, notable modifications of the affective faculties and of the character.

Victims of the genital vice become excessively timid, bashful, irritable, capricious, impatient, liars, egotists, cruel, ill-tempered and inaccessible to pity, to great aspirations, to noble actions and to good sentiments.

Pradel says: "I was acquainted with a young lady who had given herself up to masturbation from the time of puberty and when 18 years of age had experienced the disastrous consequences of it. Gifted with the most brilliant qualities she knew

perfectly where her onanistic habits were leading her and how dangerous they were to the health of both mind and body.

"She formed a resolution never again to give way to her desires and had not strength of mind sufficient to keep it.

"Finally, in despair at being unable to keep her resolve, she consulted me and said among other things: 'I find that I have two wills, one that restrains and one that seduces me; the latter in order to entice me uses the most adroit subterfuge and says always: "It is for the last time." . . . The unhappy patient died.' (1)

Two frequent if not constant results of excessive masturbation re-

(1) Loc. cit. p. 23.

main to be mentioned, antipathy to marriage and repulsion for coitus, both of which, pursuing the woman after marriage, have broken up more than one household and troubled many a family.

The onaniste detests marriage and only gives her consent to it under the influence of strong pressure by her family or of exceptional circumstances.

In such a case, coitus is a source of indifference, ennui or repugnance only, and onanism is soon master in the nuptial bed.

If the onaniste does have some pleasure in natural coitus it is rarely sufficient for her, whatever the number of connections may be, because her habitual maneuvers have developed a special centre of erotic pleasure whose solicitations will not be evaded.

Murat (2) cites the following case that is very much in point: "From her childhood Mme. X. had given herself up to masturbation. When 17 years of age she was married to a vigorous and sensual man. This union failed to cure her of her deeply-rooted habit and she would often give herself up to onanistic practices immediately after completed coitus."

RESPIRATORY TRACT.

Functional disturbances of the respiratory tract are exceedingly common in onanistes, especially in growing girls and young women. Loss of breath, choking, dry cough, precipitate respiration, vague thoracic pains, intercostal neuralgia, etc., are often found, phenomena symptomatic of general debility or of nervous irritation of genital origin, for neither auscultation nor percussion show any lesion capable of producing them.

Tissot, Schwartz, Rostan and others have mentioned this in their writings.

Leaving out of consideration the uncertainty and difficulty of enunciation so often met with in onanistes, let us take note of the diminished range, increased roughness and feebleness of the voice, in some cases going on to complete aphonia; also

the frequent "hem" symptomatic of "clergyman's throat" (granular laryngitis) is quite as common in the onaniste as in those who are compelled by their profession to use the voice constantly.

Pulmonary tuberculosis! There seems to be absolutely no doubt that it is a daily sequence of excessive masturbation as well as of excessive coitus.

Whatever the cause of this organic disease may be, experience has shown that everything that weakens the individual predisposes to it more or less, and onanism, by destroying the functional harmony of the system, may easily prepare the way for pulmonary tuberculosis or hasten the morbid process when once developed.

Becquerel reports the following case: "A young lady, 18 years of age, of strong constitution, plump and with a magnificent complexion, contracted the habit of masturbation.

"Six weeks had barely elapsed when the results commenced to show themselves; the lines of her face became drawn; she grew thin visibly and her skin lost its healthy color. She then had palpitations, with spasmodic contraction of the chest and a dry cough that was soon followed by hemoptysis.

"She was sad, discouraged and wept on the slightest provocation.

"A few remedies were tried, but without result; her menses ceased and she grew steadily worse. I suspected onanism to be the underlying cause of the whole trouble.

"Her mother, to whom I communicated my suspicions, indignantly rejected the idea, because her daughter was engaged to be married.

"The girl was sent to the country for the summer and while away from home had some trouble with her knee. While under treatment for this she was taken suddenly with severe headaches, vomiting and fever, these followed by delirium and convulsive movements. Her condition indicated danger. One night the patient was found masturbating. I was informed of it at my next visit and shortly afterwards I was a witness to this infernal habit.

"Questioning the girl brought out the information that she had commenced masturbation six months previously and that she had continued these practices during her illness.

"I remonstrated with her and promised her that I would have her married as soon as her health allowed it, but remonstrances and promises were in vain. She gave herself up to her passion before her parents, before the nurses and before anyone who happened to be with her.

"I ordered that her hands be fastened. She then made movements of the body to supply the want of hands. When forcibly restrained she became enraged and swore and used the vilest language possible. During the day her abdomen swelled; at night the delirium was intense and the patient finally became comatose and died." (1)

DIGESTIVE TRACT.

The stomach is, usually, the first organ to suffer from genital excesses. Digestion becomes difficult and slow in spite of a voracious appetite.

Sometimes there is vomiting or bilious diarrhoea, sometimes obstinate constipation, often perversion of taste, always gastralgia.

The formation of chyme is incomplete, and therefore, the intestinal absorption is imperfect; now, assimilation to repair the continued drain on the organism has recourse to an exaggerated interstitial reabsorption that brings about progressively a considerable loss of flesh and general weakness, followed later by marasmus and hectic fever.

CIRCULATION.

As regards the circulation we notice intermittent nervous palpitations, coming on after the least physical exercise and at the least mental excitement.

To these may be added irregular movements of the heart itself, "cardiac madness," as Boulland has it; also, fainting fits or even true syncope, usually coincident with the venereal spasm.

That the development of latent cardiac diseases is hastened by onanism may be readily understood.

These derangements of the circulation form, with the respiratory disorders, one of the most potent causes of that melancholia or hypochondria so often seen in onanists. Anemia, so common in females and the cause of which is often so difficult to determine, may be due to masturbation. Anemia may go on to cachexia, being sometimes, caused directly by manualization, but often only the sequence of the digestive derangements caused by debility or decay of the nerve force.

MOTOR APPARATUS.

The incessant and ruinous waste of nervous energy by the onaniste, the want of assimilation that does not permit the repair of her losses and forces her to become autophagist, cause the muscular system to feel the disastrous effects of genital pollution.

The muscles become weak, slender and lose their form and contractility. The least exercise tires them, wearies them, pains them. Falls are frequent. The legs give way under the weight of the trunk; the arms are weak and trembling and the whole body bends in a kind of precocious caducity.

OSSEOUS SYSTEM.

Rachitis and caries of the spine, with all their sequelae, are adduced by Tissot and Rostan as consecutive to infantile masturbation.

Vanier (1) says: "The influence of this evil may extend to the osseous system, causing deviations and even considerable deformation of the spine."

I shall close my long numeration of the diseases caused by masturbation by mentioning merely some others considered by different authors as sometimes due to onanism. Apoplexy (Curtis), induration, abscess, cancer of the cervix uteri (Descuret); aneurisms, rupture of the heart (Rostan); gastritis, hepatitis, enteritis, saccharine diabetes (Curtis).

As proof in support of these assertions is either insufficient or wanting, I leave the entire responsibility for these statements to the authors thereof.

(To be Continued.)

(1) Martin.—Memoires de medecine pratique, Lyon, 1835.

(1) La cause morale de la circoncision, p. 53.

Editorial

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THE OBLIGATIONS OF A PHYSICIAN TO HIS BROTHER PRACTITIONER, OR HIS FAMILY, IN THE EVENT OF ILLNESS.

In a recent editorial we had occasion to call attention to the spirit of piracy which is openly evident in our profession, especially in high places.

Dover, Dr. Osler tell us (Johns Hopkins Bul. February, 1896), was a noted buccaneer on the high seas; but he took his life in his hands when his craft ploughed the Spanish main in quest of helpless merchantmen, and his calling was by far a more honorable one than that of the medical buccaneer, who, shark-like, with his maw always wide open, engulfs as legitimate plunder his more helpless brother practitioner.

We have previously exposed the shameless rapacity of the medical colleges in New York, which, not content with the lion's share of the hospital positions, secretly conspired to capture them all.

In Philadelphia, the most ancient and popular centre of medical learning in America, we have already been treated to a practical exhibition of the indolent apathy toward the three most influential medical journals of the city, by its medical colleges. As each institution in one way or another acquired sufficient funds to publish a medical journal, in a narrow spirit of selfishness, and envious of each other, they gradually began an undermining process of extermination by withdrawing their announcements and advertisements,

cutting off their subscriptions in an offer of exchange, and, finally, throwing out of the city all of their world-famed medical weeklies.

The Medical and Surgical Reporter was the first to break away, but were soon followed by our own journal in part (The "Times and Register" is still published in Philadelphia, but its editorial office is in Boston, Mass., although it is no longer a weekly journal), and later we were followed, to the surprise of all, by the Medical News. The Reporter, has, however, recently returned to the home city.

But now we are invited to witness the most despicable and unnatural act of all: that of the consultant stooping to rob his unfortunate brother, when overtaken in adversity (i. e., exacting fees for professional attendance rendered the brother himself or his family). This vile practice moves the American Obstetrical Journal to lay on the lash of vengeance in the following appropriate terms:

"DOG EAT DOG, AND THE ETHICS OF THE PROFESSION."

"It is therefore with shame and indignation that we are compelled to recognize a tendency on the part of a certain proportion of our profession, particularly specialists, to charge other doctors and those dependent upon them for surgical attendance. A certain number of cases in which

this has been done very recently by well-known surgeons have been brought to our knowledge. We know that this shameful abuse of a trust is not general and we do not believe it ever will be so, but that it can and has been practiced openly by prominent men, in widely-separated parts of this country, should be enough to place the honorable members of the profession upon their guard and to make them ready to denounce such methods of sharp dealing and legalized robbery, wherever discovered and by whomsoever practiced.

"We do not hesitate to stigmatize such an one as unworthy of his diploma and as an offense to the honorable profession which he disgraces. He has missed his vocation, which is clearly that of horse dealer or some such 'jockeying' trade. Also, highly reprehensible is the medical patient who will not insist upon his rights

but submits to such imposition. His duty clearly is to denounce the surgeon who demands of him a fee, in his necessities, to the County Medical Society rather than to pay it and then to talk of it indignantly afterward."

If the profession would adopt this recommendation in every case of this character, the specialist or physician on receiving a fee from a brother practitioner would be unceremoniously expelled from good standing in his profession.

In no calling and among no clan in any country is there to be found a class more appreciative of a trifling favor than among the members of our own profession. We say this advisedly after an extensive experience. Our services to a sick brother or his family should always be regarded by us as a sacred duty, to be discharged with the greatest assiduity and accommodation.

THE MEDICAL PROFESSION AND THE PATENT MEDICINE TRADE.

In Boston there is quite a lively war going on between a banded society of the best druggists and certain cut-rate fellows, who are striving to knock out patent medicines from the drug trade. The condition of things is such that the patent medicine business is being rapidly disclosed in its true light—that of one grand swindle.

While this is what one might expect, when the true status of patent medicines should be brought to light, yet it is quite remarkable that such dangerous drugs as morphine, chloroform, arsenic, and a number of others, should be allowed by the State to be sold freely to the public in quantities sufficient to kill.

The medical profession have been too apathetic to the dangers of patent medicines. Individual physicians daily see cases where the ignorance of a would-be benefactor has caused the death of a patient lingering from some chronic malady, or at least has caused some serious injury to such person, from recommending a

patent medicine, which, in reality, has no application to the case.

Fortunately most patent medicines are made to "sell," in more ways than one, and for this reason contain a large amount of water, or other inexpensive substance, but now and then a patent medicine is loaded with very poisonous material designed to produce quick "cures" (?) and these are extremely dangerous to the public health.

It is a pity that no State law exists on the subject which will compel the patent medicine man to place a full statement on his labels as to the character and constituents of his remedy. We believe that the physician, as an individual citizen and member of a profession which looks to the betterment of public health, should give his serious thought and influence to this matter, and endeavor to obtain such legislation, in every State in the Union, as will restrict all sale of patent medicines without a full formula of the ingredients printed on the label.

It is almost pathetic to see the ignorance and superstition of some persons, even in higher walks of life, towards the stand a physician may take against the patent medicine man. The public at once recognize (or think they do) a strong competition between the two. They do not stop to consider the physician in the light in which they readily eulogize him on state occasions, as a man whose beneficent office knows no bounds, whose ever watchful eye is engaged in pursuits only calculated for the well-being of the human race, whose energies are always directed to the relief of his suffering fellow-being, and that study, thought and strength are never spared, night or day, to promote these ends. These things are all true of the true physician, but are too readily forgotten by the public when the doctor chances to protest against a venomous evil, which he knows to be eating away at the vitals of individual constitutions, to say nothing of wasteful expenditure of money.

If one cares to inquire into the magnitude of this patent medicine evil, let him cast his eye over the shelves of the "back room" of an apothecary establishment and count the myriads of different cough, kidney and consumption "cures" (?) which are lauded to the skies for all sorts of ailments. The very tone of

the language used on the labels of some of them would provoke distrust to the ordinary business man, were the same used to urge him to buy stock in a manufacturing concern, yet he will unhesitatingly squander his money, time and health in an attempt to prove the claims of the patent medicine man, and lend him his picture for "a consideration," to go the rounds of the daily press, in the bargain.

This picture advertising of faces of Senators, Judges, etc., by patent medicine men has progressed to such a degree that one is fairly certain of what men in public office are the ones who can be "brought up" for any particular legislative measure. We think that this side of the question has never occurred to said Senators, etc., but it might be well to remind them that such is the normal conclusions one must come to on seeing their picture in the public press advertising these vile stuffs.

Let us, then, put our shoulder to the wheel to root out this menace to public health, not as partisans of an uncharitable disposition, or on account of its seeming competition to our profession, but because it is a mighty and real evil which can only be controlled by active legislation, and we are men true to our personal responsibility in the welfare of humanity.

AN APOLOGY.

We have noticed that on several occasions, somewhere on the road between writer and reader, credits for various abstracts have gone astray. Not wishing to sail under false pretenses and thinking it hardly fair to our exchanges that this has happened, we wish to state that, to the *Independence Medicale*, of Paris, to the *Revue Medicale de Louvain*, to the *Therapeutische Wochenschrift*, of Vienna, and to the *Nordiskt Medicinskt Arkiv*, of Stockholm, we are often indebted for interesting ex-

cerpts from medical journals which are not upon our exchange list.

The *Independence Medicale* has a long abstract of Dr. Dunham's article on the germ theory, that appeared in the "Times and Register," of December 28, 1895. We had occasion to speak a few words about our French contemporary some time ago. It is now one of the best medical weeklies that has come to our notice, and should be in every medical library and reading room in the country.



WHAT HAS ELECTRO-THERAPY TO GAIN FROM THE ELECTRICAL MATHEMATICIAN—A REPLY TO A THEORETICAL CRITICISM OF MY METHOD OF THERAPEUTIC MEASUREMENT AND REGISTRATION.

S. H. MONELL, M. D.

Readers of the "Times and Register" are aware that I recently published an account of "A Practical Method of Measuring and Registering the True Therapeutic Dose of Induction Coil Currents." In the absence of an electrical Volt-meter, Ammeter, Watt-meter, or any other direct medical dose measurer, my method was offered as a substitute until a better means should be found. The method is all that was originally claimed for it in accuracy and completeness, and can be practically demonstrated to any physician's understanding. Any theoretical questions as to its efficiency are promptly satisfied by a personal experience with its simplicity in operation. An esteemed trade contemporary in Chicago, to wit, the Electrical Journal, copied my article under the sensational and erroneous title: "Alternating Current Meter," with a sub-title, "A New and Unique Method for Determining Faradic Dosage for Purposes of Record—Not Necessary for Operative Employment." The sub-title is correct, but obviously, the author's rheostat should not be referred to as an "Alternating Current Meter," in large type and without warrant.

The substance of my article was, however, published without other change than typographical errors, and in a later issue of the journal is a letter from a correspondent, in which head lines inform readers that "He takes issue with Doctor Monell and points out defects of latter's newly-invented device." This again is decorated with the words "Alternating Current Meter," in large type

at the top. At the moment of reading this alleged criticism I accepted the internal evidence of the letter itself as proof that the writer was merely a somewhat conceited school boy, of the "Louisville Manual Training High School," from which it emanated, and whose anxiety to see his name in print out-paced his stock of practical experience as well as courtesy. His arrogant manner of disputation certainly offered no encouragement to take him seriously, and the following note was mailed to the journal in reply to a request for my views:

A PRACTICAL METHOD OF MEASURING AND REGISTERING THE TRUE THERAPEUTIC DOSE OF INDUCTION COIL CURRENTS.

I have just read with a mixture of incredulity and amusement the remarks of one H. G. Brownell, of the Louisville Manual Training High School, in which he mathematically demonstrates in your interesting journal that "Electricity cannot be measured by ohms," and declares that the method of dose measurement which I humbly ventured to describe to the medical profession without first asking his permission "is not worth an instant's consideration."

Perhaps not, but in a year of practical use it has worked fairly well, without any of the "peculiar and even disastrous results" which my fanciful critic predicts. My article was originally published in the New York Medical Record under the proper title which I place at the head of this communication. In republishing it in your issue of January 15 with a title wholly unwarranted by any claim put forth by the author, you appear to have misled your impulsive correspondent, who seems to have paid more attention to your substitute title than to the original text of my article. The cocksureness of the young man is, of course, prohibitive of any attempt to reason with him, but possibly when he gets through his course of manual training and devotes some time to training the gray matter of his cerebral convolu-

tions, a well-sharpened lead pencil in his dextrous hands will not so egregiously outrun the balance wheels aloft. His evident ignorance of the clinical aspects of the case and his ludicrous jump at a single point, which he, in ignoring the totality of my method, thinks is vulnerable, reminds me of the precocious little boy who conclusively proved by unassailable figures that if a fish was put into a bowlful of water there would be no overflow of H₂O.

A year or more of actual experience in the use of my apparatus in the treatment of a large number of clinical cases might teach this cocksure critic, who charges me with "jumping at conclusions," that while theories and figures may be very well, he should base them upon correct premises. Will you kindly allow me to say in closing that the Monell Induction Coil Apparatus for therapeutic use (not electric light and power purposes) is approved and successfully marketed by the reliable house of Kidder & Co., of New York, whose experience of nearly forty years in the manufacture of high-grade electro-medical apparatus qualifies them, perhaps, to judge of the practical merits of a matter which they closely observed and tested in all its details before indorsing it with the stamp of their well-known names. If your correspondent ultimately becomes a practicing physician and familiarizes himself with electro-therapeutics and the treatment of disease, his future opinion may be worth answering. His present aminadversions are not.

Respectfully,

S. H. MONELL.

Feb. 19, 1896.

His confused figures and his fondness for deriving his facts from a vivid imagination certainly justified the belief that my critic was a first course under-graduate student, but I since learn from an editorial statement, which at first escaped me, that he is not only a "Professor," but was "late chief instructor of the National School of Electricity." The editor of the Electrical Journal further says: "Professor Brownell has so clearly voiced some of the questions that presented themselves to us at the time, that we are willing to allow his criticism to stand for us." This editorial indorsement of a gratuitous criticism, which of itself was not worth a reply, requires that I shall repeat here the principal paragraphs in which the "Professor" points out the defects alleged, and airs his own mental defectiveness at the same time. They read as follows:

(1) I was much interested in reading Dr. Monell's article * * * because of the new electrical theories advanced and because of the fine example of jump-

ing at conclusions. (2) Ohms law, apparently, was not considered (3) and the system if it could be put into operation would lead to some peculiar and even disastrous results. (4) The author's definition of a proper faradic or alternating current dose seems to be the energy the patient can readily bear without pain, and the measure of this energy is recorded in ohms or in terms of resistance.

(5) In the first place, energy is work and not resistance nor current. (6) Let us assume that the E. M. F. of the secondary coil in the author's illustration was 50 volts, resistance of patient 5000 ohms and resistance of coil 2000 ohms. The current was first felt when the rheostat stood at 700,000 ohms, and the resistance of the whole circuit was therefore 707,000 ohms. The current was 50-707,000 amperes; total energy expended in circuit, 50x50-707,000, equals .0035 Watts, and all but 5-707 was expended in the rheostat. (7) When the current was sufficiently strong the rheostat stood at 100,000 ohms, and the energy of the circuit was, therefore, 50x50-107,000, equals .0233 Watts. (8) Of this, 5-107, or .001 Watts was expended in the patient. (9) This is only one-third the energy which was originally expended in the 600,000 ohms of resistance, which were cut out of the circuit (10) instead of being equal to it, as is stated in the article.

(11) Suppose, now, some other physician were to take the record "dose 600,000 ohms" and apply it to a similar case with a similar or even the same coil and an equal number of cells of the same kind of battery. (12) But suppose these had run down somewhat—the author says this will not affect the accuracy of the dose record—so that the E. M. F. of the secondary coil is only 40 volts instead of 50 volts. This would cause first perception to take place with a lower resistance. Suppose this be reduced to 600,000 ohms. Then when a "600,000 ohms' dose" was administered the rheostat would be cut entirely out. The total circuit energy would be 40x40-7000, equals 0.23 Watts, of which 5-7 or 0.164 Watts would be expended upon the patient. (13) This is 164 times as much energy as the first patient received, yet the difference in the rheostat readings or "dose" was the same in both cases.

(14) In example 1 the E. M. F. at the electrodes would be 2.34 volts. In example 2 it would be 12 times as much, i. e., 29 volts. (15) Therefore, this system insures similar results only when batteries, coils, primary rheostats I and first perceptions as indicated by the secondary rheostats are all precisely alike, (16) a thing which will practically never occur. (17) The author's statement that "there is no parallel to this precision of record to be found in the literature of faradic electricity" may be true, but a system which permits of such vast errors as are shown above is not worthy of an instant's consideration.

H. G. BROWNELL.

I. Why does Brownell lug in a primary rheostat which I expressly

exclude from my method? Can it be that he is really not talking about my method at all, but something of his own prescribing?

In condensing this Brownell effusion to the above paragraphs I have added materially to its clearness, for the writer of it apparently does not excel in the faculty of plain statement. His reasoning is so confused, indeed, that any form of clearness would be incompatible with his logic, and he has done well to maintain the unities.

For the sake of definiteness I have numbered his separate assertions and shall proceed to show that every one of them, from 1 to 17, is a fine example of jumping at conclusions, and that "the new electrical theories advanced" are his personal and unsupported assumptions. Furthermore, I shall show that this alleged critic fabricates the whole structure of his fantastical argument out of theory alone; that he misrepresents the method I described, and that in the manner of his discussion and in his egotistical and insolent dismissal of the method which he mangles so maliciously, he forgets the ordinary courtesy of debate, and compels the castigation I shall now bestow.

First: It is well known that no faradic meter equivalent to the constant current milliamperemeter, as a dose-measurer for medical usage, has ever been devised. In the absence of any direct meter, a substitute method possessing practicability is amply justified in the case, and is an improvement upon guess work. In my article on the subject I remark:

"No automatic meter or measuring instrument is required to select the proper dose of faradism for a patient, or to adjust it to the needs of therapeutic use. Direct currents need such an indicator, but induced currents do not. The educated skill of the operator regulates the dose and does it adequately. The existing need is for a standard system of recording the dose administered, and thus impart uniform value to the reports of clinical cases and introduce precision and definiteness into the special literature of the subject."

I suggested such a practical method in a combined record of every factor which affects the action of the current, viz.: 1. Character of the induced current as determined by the coil employed. 2. Description of

electrodes and their situation and polarity during treatment. 3. Rate of current interruption. 4. Tissues treated, condition, etc. 5. Current strength. 6. Time and frequency of administration.

To represent, by substitution, the unknown factor of current strength (all others being easily recorded). I suggested a record of the amount of resistance to the current cut out of my calibrated secondary rheostat between the zero of the clinical application and the full current applied, "the strength of the current increasing in the patient in proportion as the resistance was cut out of the rheostat."

Among other examples given in my article is one selected for particular attack by Brownell, viz.:

"To illustrate the method, let us hold, for example, two ordinary electrodes in the hand, select for our coil one thousand five hundred yards of No. 36 wire and employ very slow interruptions of, say, seventy per minute. We raise the rod in tube 1 to its full height and switch four cells into circuit. Gradually lowering the contact rod we note the point where the current first becomes perceptible to sensation. It is (in this instance) at 700,000 ohms resistance on the scale. Taking this as our zero unit we continue to lower the rod until muscular contractions are produced as strong as we desire. The rheostat now indicates but 100,000 ohms, showing that 600,000 ohms of resistance have been removed from the passage of the current into our arm muscles, which feel and respond to the force previously expended within the rheostat. If now I record the facts: Coil, 1500 yards of No. 36 wire. Interruptions, 70 per minute. E. M. F., 4 cells. Dose, 600,000 ohms; small sponge electrodes in hands; positive in right. I can repeat the exact application and muscular effect whenever and as often as wished, even should the cells deteriorate by use so as to require five or six cells to equal the energy recorded. There is no parallel to this precision of record to be found in the literature of faradic electricity."

This complete statement of what was done in treating the patient is my form of dose record, and if clinical investigations were reported with this clearness of detail, we could compare results more satisfactorily than has ever been done before.

Brownell says (2), "Ohm's law apparently was not considered." Ohm's law was considered by Professor Crocker, of Columbia College, when

he calibrated my rheostat; it was considered by me when I originated the method I described, and Brownell's assertion to the contrary is either proof that he "jumped at his conclusions," without reading my article or that he deliberately misrepresents the case. Either explanation is significant of his critical attitude throughout.

Brownell declares (3) "And the system, if it could be put into operation, would lead to some peculiar and even disastrous results."

In my original paper I state that the method has been tested by a year of practical demonstration and satisfactory use. Brownell disputes my veracity, and implies that all persons connected with the process of demonstrating this practicability are impostors, by figuring out the theory that no one can do at all what we have actually been doing in a variety of cases. Does he jump also to his remarkable conclusion that besides being impossible, the method "would lead to some peculiar and even disastrous results." Physicians have got along without "disastrous results" while employing medical induction coil currents without any systematic form of noting down such an account of treatment as could be substantially followed by another operator. I venture to present to the medical profession a very simple and easily-understood method of making an intelligent record, and presto! the same physician whose patient was safe from harm before, finds himself liable to produce "peculiar and even disastrous results." We are asked to believe that his accustomed skill in regulating the dose suffers general paresis the moment he marks down the dose he has administered, although he does not do this until after the seance is completed!! The "peculiar result" of such whimsical sophistry is apparent only in the reasoning of this extraordinary critic, whose disregard of the elementary conditions of electro-therapeutics is only equaled by his confidence in advancing preposterous "new electrical theories," and "jumping at conclusions."

In paragraph 4 Brownell attempts to foist on me an alleged definition of a "proper faradic or alternating current dose," which beautifully illustrates his own intolerance of intelligence in others, and his habitual incompetence to state any matter fairly. The basic idea in medicine, that a proper dose is that which will secure the desired therapeutic effect, is too reasonable and simple to find lodgment in the bewildered mind of the theorizing electrical mathematician. I scarcely need defend myself from this foolish charge.

But let us examine one of his own definitions. In (5) he declares that "energy is work." Is it? Did he consult a dictionary to ascertain, or did he characteristically "jump at this conclusion." Both the Century dictionary and Webster contradict Brownell's definition of the word, while I resent the unwarranted and offensive slur which implies that I ignorantly define energy as "resistance" or "current."

In assumption (6) of this ground and lofty acrobat and electrical theorist we come upon an array of figures built out of a picturesque series of jumps at conclusions, volts and resistances, rendered necessary by his want of knowledge of the essential facts involved in the clinical application of medical induction currents. His mathematical exposition of Ohm's law on fictitious and assumed premises reminds us of the mountain in labor bringing forth a mouse.

Taking one known quantity furnished in my article (my rheostat scale of resistance) he jumps at all the other facts (?) relating to E. M. F. coil and patient, and then spouts.

The futility of such figures and the utter uselessness of refuting them will be apparent to any physician who sits down before a patient with an induction coil apparatus at his hand, while he reads that according to Brownell law the dose he must administer to contract the arm muscles vigorously to the shoulder is .001 watts. But this is not all the foolishness of Brownell law. In three distinct sets of figures he "proves" (?) that the increase

in "dose" from zero to the current which contracts the arm muscles from wrist to shoulder is about seven-fold. In a fourth set of figures he "proves" (?) that .001 watt dose is 2.34 volts at the electrodes. (This, with a long fine coil.) II. Now, let any physician, however untrained in

II. Does Brownell mean that this alleged voltage (2.34) is the same at both electrodes? If so, how does he explain away the fact that the muscle stimulation at one electrode is several times greater than at the other? Or has this information not yet reached him, or has voltage nothing to do with effects? Has Brownell determined the difference between the make and break currents, and how many times stronger one is than the other physiologically.

electrical equations, take a Monell apparatus and proceed to make a practical application of my method as described fully in my original paper. Can any theoretical argument convince him afterwards that the physiological effect which he has demonstrated is caused by a "dose" only seven times greater than one producing no effect at all? Is any one certain what the electrical current generated by the secondary electro-magnetic induction coil is? Can it be positively conceded to be equal and identical in character with alternating dynamo street currents? III.

III. Is the interrupted secondary coil current of the Monell apparatus an alternating current at all in the usual sense of the word? Does Brownell imagine it to be a to and fro current equal in both directions?

Is the physiological effect of the coil current conformable to the volt, ampere or watt or fractions thereof? What have volts to do with magnetic saturation? Does the human electrolyte offer to the action of the current the passive condition of a metallic circuit?

What also about the characteristics of static (Holtz) machine currents and their estimated voltage and amperage, as compared with physiological effects substantially the same in certain applications as those produced by some faradic applications? The induction coil current performs "work" in the tissues, and is no doubt something in volts and milliamperes, and we can recog-

nize, feel and demonstrate the work it does, yet, so far, we cannot measure the actual current.

Ohm's law is one thing, but Brownell's law, worked out on "jumped at conclusions" and imaginary hypotheses, is quite another thing.

In reality, however, every doctor knows that the mere ratio of increase in current voltage, amperage or "rate of working in the induced current" (expressed in watt units) is not the decisive factor in curative results, whether this ratio be seven-fold or seventy-fold or only two-fold. If the desired therapeutic effect is produced by any ratio of increase whatever, the clinical purpose is accomplished, no matter what figures can be juggled to apparently express a thing which is always regulated by practical skill and experience, regardless of blackboard calculations of commercial currents running through metallic circuits. IV.

IV. Observe "Brownell law" applied to the dose of digitalis! Citing from Bartholow, the dose is: Abstrat digitalis, gr. ss. i; extract, gr. ss. ii; fluid extract minims i, iii; tincture minims, v. dr. i; infusion, dr. ii. oz. ss. Here be "vast errors" galore, for according to all evidence of apothecaries' weights and mathematicians' "laws" gr. ii is four times gr. ss, and oz. ss is 240 times m i; hence "peculiar and disastrous results" would ensue if these doses were given. Yet they are prescribed daily.

But, in paragraphs 11 and 12, my eager critic achieves a new height of blundering eccentricity. He "proves" that when 4 cells have run down 20 per cent. in E. M. F., my unfortunate patient gets 164 times stronger current than he did when the cells were new! This is 23 times the seven-fold increase above zero, which was all the poor man could stand "without pain," in example number one, and is evidently the "disastrous result" prognosticated by Brownell in an earlier paragraph. Think of startling an unsuspecting patient by a sudden jump in his full dose of 16,400 per cent.!! This is worse than jumping at harmless conclusions. It might well be disastrous or even fatal—if it happened. Brownell certainly sheds a new and unexpected light—one of his new electrical theories of peculiar brightness!—on the efficacy of short-cir-

cutting fresh cells and running down their E. M. F. before using. Instead of discarding our old cells, under the mistaken idea that they are worn out, we may go on using them with positive and enormous advantage—although evidently at some risk to our patients, unless we devise a powerful current controller to reduce the dose below the danger of hurting anybody. Just think of the boom in old faradic batteries as soon as this news gets out into the country districts. I am sorry that Brownell did not figure the full potency of four exhausted cells, for, if a loss of 20 per cent. causes our patient to receive "164 times as much energy" as par cells, we cannot help marveling a little at the good results we might get from a further loss of voltage of 30, 40 or 50 per cent.

According to Brownell law, a man who buys a new suit of clothes can wear out the coat and have 164 full suits left.

But I must break away from this attractive thought to point out that the whole of paragraph 12 is an arbitrary attempt to distort the plain meaning of my language and misrepresent the example cited by me. Not content with isolating the rheostat record, which is but a single factor out of six in my complete dose record, and asserting that it alone constitutes the "dose," he ignores the fact that if the four cells (per my illustration) afterwards run down and fall short of sufficient therapeutic E. M. F., a physician has only to switch another cell, or if need be, two extra cells, into the circuit to bring the current up to his needs. I grant that a gifted mathematician who can get "164 times as much energy" out of deteriorated cells as mere medical men can out of fresh cells would not need to switch others into the circuit, but to a plain, simple-minded physician, the idea would seem rather practical and useful.

The assertion in (14) that the E. M. F. at the electrodes would increase 12-fold under his process of increasing the efficiency of 4 cells by taking 29 per cent. off their E. M. F. is another fine example of Brownell law

which will not bear the practical test of one instant's contact with the electrodes. It is so farcical that it is idle to treat the statement seriously. I possess the apparatus, have made the test and take issue with Brownell law on this point. A 12-fold increase of a current already as strong as a patient "could readily bear without pain," would admit of demonstration by the crudest clinical test. The fact is that no such increase takes place in practice. Moreover, I have taken my apparatus and tested anew every assertion which appears in my original article. I adhere to them all and declare that they are borne out by practical experience. I have also taken my apparatus and put Brownell's assertions to the proof of practical test. Not one of them will bear the test of a clinical application. They one and all are utterly without point or practical value in the treatment of disease. They signify nothing. One word in regard to Ohm's law which Brownell affirms "was apparently not considered in the system." The idea of any electrician ignoring Ohm's law is exhilarating in its breezy freshness, but like other ideas of this curious exponent of "new electrical theories," it is incompatible with common sense. Space will not permit me to print here all that was shown in my original article of the true relation between Ohm's law and my method of substantially determining the values of therapeutic dosage. Readers will find the full account in the last two issues of the "Times and Register," as well as in other journals. I may now state, however, that the principle of Ohm's law undoubtedly governs the circuit of the induction coil current in which my calibrated rheostat is inserted. This fact is itself the actual basis upon which my method is framed, and which makes it superior to any method previously suggested, Brownell, to the contrary, notwithstanding. Nevertheless the interpretation of the law in figures is uncertain. In his process of abusing one of my illustrative cases he demonstrates that the minimum current was about 1-14 milliamperes and the maximum current seven

times greater, to wit, 1.2 milliamperes; that the minimum current was, within the patient, 5-707 of the circuit, and the maximum about seven times greater, to wit, 5-107; that the minimum energy thus expended in the patient was .0035 watts and the maximum dose about seven times greater, to wit, .0233 watts. Had Brownell's reasoning powers permitted him to calculate one step further and show that when the current was at his 1-14 milliamperes value, my rheostat resistance was just about seven times greater (700,000 ohms) than it was at his 1.2 milliamperes dose (100,000 ohms), he would have completely demonstrated, as I remark in my original article, that things which are equal to the same thing are equal to each other, and proved the scientific accuracy of a method which he has labored in vain to disprove.

The proportion in all these cases between the minimum and maximum values of the dose is as seven to one, and bears out my assertion that the current strength rises in proportion to the descent of the resistance in the rheostat. Brownell quotes this statement of mine, decorates it with italics of his own fancy and tramples it under foot, figuratively speaking.

But as the principle of my statement is true, and as Brownell's own arithmetic proves it in several convincing ways, it requires no modification at my hands. Nevertheless, it is impossible to directly demonstrate the amperage or the voltage of the faradic current during clinical application and within the patient's tissues, nor would it be useful to do so. By comparative methods of measurement the theoretical values may be estimated, but neither Brownell nor Edison nor any living man can produce a direct measurement capable of accurate repetition of that particular predominating factor of an induction coil current on which its medical uses and its physiological effects depend. If a wattmeter was made to show that the patient received—as Brownell claims—.001 watt, we have only to define a watt to recognize its utter inutility

as a stamp of dose valuation. "Watt is the unit of electrical activity. It is the rate of working in a circuit when the E. M. F. is one volt and the current one ampere." It is obvious, therefore, to all physicians, that the most exact demonstration that a current applied in general or local faradization with various coils was either 1.2 ma., or 50 volts or .001 watts, would furnish no practical guide to the effect upon the patient, nor would any physician be able to compare or repeat effects by following such a dose record alone. One of the most useless indications of a clinical dose would accordingly be the "rate of working" in the circuit, which Brownell produces with great pride as the ne-plus-ultra of his mathematical gyrations. Rate of electrical activity may bear the same relation to the therapeutic result of the current as the rate of speed at which a carpenter builds a barn bears to the barn when complete. But that it is not considered as a satisfactory guide to whether the clinical result will be great or small, stimulating or sedative, physiological or pathological may be inferred from the fact that the elaborate index of the latest and greatest work on medical electricity ever published does not contain the word watt at all, nor discuss its relation to therapeutics. The carpenter's rate of work is not the barn his work builds. Referring readers, however, to my previous article for a full account of my method, as Brownell's garbled version of a small portion of its entirety conveys no real idea of the merits of the subject, I reassert that "the author's method is a comparative record of the current strength," and that by this method "our knowledge of Ohm's law substantially defines for us the values of therapeutic dosage." These conservative statements on my part are as true to-day as when written, and they will successfully bear the severest tests of practical (not merely theoretical) demonstration. What I have done is to provide a rational substitute record for the direct record of a therapeutic meter, which has yet to be invented. To criticize my useful

and humble rheostat for not being the long-sought meter, which it does not claim to be, is insolent effrontery of an aggravated type. It is equally arbitrary and unwarranted for Brownell to hold up to view the fragmentary record "Dose 600,000 ohms," and then labor to disprove what was never claimed, i. e., that a dose value can be expressed by any isolated number of ohms. The idea of a dose record, as fully described by me, is altogether a different matter, and takes into account every factor of the clinical administration on which the result of treatment depends—and these usually number five or six instead of one alone, as considered by the theoretical Brownell. His exposition of the alleged value of the E. M. F. at the electrodes, or the watts received by the patient, or of any other feature of the dose of a high tension induction coil current from the circuit of which a specific number of ohms of rheostat resistance has been cut out imparts nothing to the interpretation of the clinical facts. His attempt to discredit my method is preposterous and silly. If he does not appreciate his blunders it is useless to reason with him, and argument is unnecessary when the apparatus for actual test is at hand.

The reasoning by which he strives to support his proposition is based solely upon hypothetical premises, of which the true facts are unknown to him or to anybody else. His criticism is offensive in manner, discourteous in tone, false in logic, in error in its alleged facts, unfair in its presentation of my text, and asserts that I say what I do not. Had Brownell displayed any disposition to take courteous issue with me on matters of opinion, I would have taken no exceptions to either his ignorance or errors. Where mental astigmatism ends and bump-tious ignorance begins I care not, but the manner in which he shuffles and cuts Ohm's law to suit his peculiar style of debate would put him out of court in any reasonable discussion. He crowns his Quixotic tilt at my practical and reliable substitute for a direct method of dose

measurement and registration, by declaring that a system which "permits of such vast errors as are shown above is not worthy an instant's consideration." The "vast errors" he shows are his own, not mine. His curt conclusion is as fallacious as the argument it crowns, and the editor who not only admitted his letter to the columns of his journal, but deliberately assumed the responsibility for the averments it contained, owes an apology to his readers for what, in effect, is an attack upon the intelligence, reputation and veracity of a physician whose professional good faith is concerned in vindicating the reliability of a method of electro-therapeutic technique which he has originated and described.

865 Union street, Brooklyn.

P. S.—In taking a final glance at Brownell's "new electric theories" it seems to me that one of the most ridiculous things in his position is his laboring to prove the truism that when resistance is cut out of part of a circuit the current will be distributed through the remainder of the circuit. Of course, it will, or else there would be no circuit left—or the current would stand still, which is a contradiction. If a horizontal pipe ten feet long contains a body of water distributed throughout its length and two, four or seven feet of the pipe is cut off, without removing any water, the fluid must back up and increase its depth in the remainder of the pipe "in exact and equivalent proportion" to the length cut off. Brownell evidently discovered this truism in some way, but he thinks it is too deep for me, and he bases much of his freakish criticism on this assumption. He objects to my position that the current will increase in the part of the circuit between the applied electrodes in exact proportion as the resistance in the rheostat is reduced, but, inasmuch as the total value of the current is unchanged when the three inches of tube is cut out of conduction the value must be distributed in the remainder of the circuit in proportion to the capacity of its parts. As the tissues between the electrodes are part of the circuit they obviously and undeniably must receive their exact proportions as stated by me. To reach down to the level of such rudimentary reasoners as Brownell it would have been necessary to further state the equally obvious truism, which I omitted, that the rest of the circuit got its share also; but life is short, and unless common knowledge of fundamental axioms is taken somewhat for granted by authors and critics there will be no time to explain things less trite but possibly more interesting to readers than a repetition of the alphabet they already know.

AUTHOR.

Book Reviews.

SYPHILIS IN THE MIDDLE AGES AND IN MODERN TIMES. By

Dr. F. Buret, Paris, France. Translated from the French, with notes, by A. H. Ohmann-Dumesnil, M. D., Professor of Dermatology and Syphilology in the Marion Sims College of Medicine. Being Volumes II and III of "Syphilis to-Day and Among the Ancients," complete in three volumes. 12 mo., 300 pages. Extra cloth, \$1.50 net. Philadelphia: The F. A. Davis Co., Publishers, 1914 and 1916 Cherry street.

In the book that lies before us we

have the results of three years' work and careful study.

While the original is written in a most attractive manner, its every page shows evidence of most thorough research and clear deductions from all available documents.

As a handy history of that protean disease, syphilis, has been a long-felt want in the English language, we must be grateful to Professor Ohmann-Dumesnil for giving us one that, in his magnificent translation, fully equals the original.

The press work of the publishers is too well known to require comment.

Correspondence.

WAYSIDE NOTES.

Ernest B. Sangree, A. M., M. D.

At the present day we read, with surprise and amazement, thank Heaven, of the religious superstitions and intoleration of a few hundred of years back, of the beliefs in witches and witchcraft, of demons and the proper methods of exorcising them, of conversions by fire, torture and the sword.

Happily those days can never come again; but may we not fondly hope that the moralist of a hundred or two years hence will not similarly read with amazement of the medical credulities and superstitions of this otherwise fairly well enlightened age?

Will it not seem strange to him that a race whose scientific knowledge has altered the face of the earth, and who, the records will show, persistently sought after truth in every other direction, willingly worshiped the lie in medicine. But when such men as

our intelligent railway princes, skilled lawyers, and, for instance, such a generally brainy man as Chauncey Depew, are willing to publish themselves as having been greatly benefited by a rheumatism ring, what are we to expect of the common herd?

Yesterday I went to see the "vitalpathic" doctors' exhibition. They advertise to cure anything, simply by laying their hands on the patient. A large hall was crowded to its utmost with perhaps two thousand people, some of whom had stood in the cold and wet for two hours, on the step outside, so that they might be first when the doors were opened, and thus get up for certain on the healers' platform.

Indeed, about one-fourth of the audience tried to get on the platform, and had actually to be driven back. These frauds then took one by one the several people they had

on the stage for exhibition purposes.

Paralytics, rheumatics, the deaf, people with tumors; every one, without exception, was promised a cure; there was no failure possible. A few rapid passes of the vitapath's hands over eyes, head, down arms and legs, and the patient was told to walk; at the same time being assured that he had no more pain, or whatever else the malady may have been. Did the patient maintain that he still had pain, then it was a most obstinate case, and would require several treatments to entirely eradicate it.

But as his chances of getting upon

the platform again were rather limited, the sufferer as well as all the other gaping-mouthed people, were told where the office was, and the hours in which the healers could be found.

Of course, the craze can last a comparatively short time, but in that period these miserable fellows will pick up from the credulous sufferers many a pretty penny.

"Yes," remarked the female dispensary patient, glibly, "His arm was either broken or fractured; I don't know which."

Current Medical Literature.

CELERY AS A CURE FOR RHEUMATISM.

New discoveries—or what claim to be discoveries—of the healing virtues of plants are continually making. One of the latest is that celery is a cure for rheumatism; indeed, it is asserted that the disease is impossible if the vegetable be cooked and freely eaten. The fact that it is almost always put on the table raw prevents its therapeutic powers from becoming known. The celery should be cut into bits, boiled in water until soft, and the water drunk by the patient. Put new milk, with a little flour and nutmeg, into a saucepan with the boiled celery, serve it warm with pieces of toast, eat it with potatoes, and the painful ailment will soon yield. Such is the declaration of a physician who has again and again tried the experiment and with uniform success. He adds that cold or damp never produces, but simply develops, the disease, of which acid blood is the primary and sustaining cause, and that while the blood is alkaline there can be neither rheumatism nor gout. English statistics

show that in one year (1876) 3640 persons died of rheumatism, and every case, it is claimed, might have been cured or prevented by the adoption of the remedy mentioned. At least two-thirds of the cases named heart disease are ascribed to rheumatism and its agonizing ally, gout. Smallpox, so much dreaded, is not half so destructive as rheumatism, which, it is maintained by many physicians, can be prevented by obeying nature's laws in diet. But if you have incurred it, boiled celery is pronounced unhesitatingly to be a specific.

C. M. J.

SLEEP FOR CHILDREN.

A German specialist says: "Nature has recently pleaded for giving children more sleep." A healthy infant sleeps most of the time during the first few weeks, and in the early years people are disposed to let children sleep as they will. But from 6 or 7 years old, when school begins, this sensible policy comes to an end, and sleep is put off persistently through all the years up to manhood and womanhood. At the age of 10

or 11 the child is allowed to sleep only eight or nine hours, when its parents should insist on its having what it absolutely needs, which is ten or eleven at least. Up to 20 a youth needs nine hours' sleep, and an adult should have eight. Insufficient sleep is one of the crying evils of the day. The want of proper rest and normal conditions of the nervous system, and especially the brain, produces a lamentable condition, deterioration in both body and mind, and exhaustion, excitability and intellectual disorders are gradually taking the place of the love of work, general well-being and the spirit of initiative.

—New York State Med. Jour.

IODINE IN DERMATOLOGY.

Good results are obtained from its topical use in ringworm, alopecia circumscripta and tinea versicolor. In ulcerative stomatitis, fungous gums and various chronic anginas, painting with tincture iodine is an efficacious procedure attended by no inconvenience.—Comby.

NEPHRITIS.

I advise the treatment of nephritis by inunction of an ointment of pilocarpine nitrate—a procedure advised by me in joint disease in 1882. I in this way secured a purely local diaphoresis with a minimum dose of alkaloid, and without the inconveniences and dangers which sometimes attend its subcutaneous injection.—Molliere.

A MALPRACTICE SUIT.

A malpractice suit recently decided in Milwaukee, Wis., is of interest in several particulars. The trouble grew out of the accidental leaving of a rubber drainage-tube in the pleural cavity. A physician, the defendant in the case, was treating a young man, aged 16 or 17 years, for empyema. An operation had been performed—a resection of one rib—and drainage provided for by means of two properly placed tubes; these were secured in position by two

silk stitches, each stitch passing through a tube and the skin. The wound discharged freely for several days. Upon one occasion, in dressing the wound, the doctor, having gathered up the soiled gauze and thrown it in the stove, noticed that one of the tubes was missing. The dressing had been removed in such a way as to lead him to think that the tube might possibly have been thrown into the stove along with the soiled dressings. Examination with probes and forceps failed to locate the tube in the empyemic cavity. The gauze was burning or burned, and it was difficult to decide positively where the missing tube was. Another complicating circumstance was the fact that, on the day previous to this, the dressing had been changed by the mother of the patient and in the absence of the doctor. Under these circumstances it was not deemed best to enlarge the wound or make other incisions to look for a tube that might have been thrown into the fire or otherwise lost outside the boy's chest. The wound healed in about the usual time, and convalescence seemed fairly established. Some months later, however, there was a slight purulent discharge through a fistulous opening in the wound, and the boy was told that a second operation would probably be necessary.

The patient then consulted a second physician, by whom he was sent to a hospital and operated upon. Resection of three or four ribs was deemed necessary, and in the discharge thus liberated was found the missing drainage-tube. The patient recovered, and suit was then brought against the first physician for \$20,000, claiming damages for long illness and permanent deformity.

The case was tried three times. In the first trial the jury did not agree; in the second the plaintiff was given a verdict for \$2000; in the third, the Judge threw the case out, on the ground that the plaintiff had not shown in the trial that his illness and disability were due to lack of reasonable skill and care on the part of the first physician.—Med. and Surg. Reporter, Nov. 20, 1895.

German and Italian

Translated by DR. F. E. CHANDLER.

POISONING BY SUB-NITRATE OF BISMUTH USED AS A DRESSING POWDER.

This drug is often used for dressing burns and wounds, and Drs. Gaucher and Balli have noticed unfavorable symptoms following its use.

The most characteristic symptoms are those of a more or less intense stomatitis.

Digestive disturbances sometimes occur, principally dysphagia, vomiting and diarrhea. The urine may be darkened and contain albumin.

This action of the drug is curious, because it may be given internally in almost any dose, without causing the least systemic or local disturbance.

—Revue Med. de Louvain.

INFANTILE GONORRHEA.

Dr. Fischer, of Altona, has for two years carefully examined all cases of infantile gonorrhea that came into the hospital. He found 54 cases of vulvo-vaginitis, and 50 of these were of specific origin.

Ten of the fifty children were infected outside the hospital. Of these, one had been assaulted; two others had older sisters who had been affected; the mothers of four of them were suffering from gonorrheal discharges. A little daughter of an innkeeper was thought to have contracted the disease from the closets, and two children came from another hospital, where they had been endemically infected.

From these data the conclusion is easily drawn that infantile gonorrhea is rarely caused by rape; but usually is communicated by some member of the family; by the servants, or by some person stopping in the house. In this way may be ex-

plained its appearance, epidemic and endemic, in boarding schools and hospitals. In the children's hospital in Altona gonorrhea has been endemic for years.

Usually this disease made its appearance after the arrival of a child suffering from it. Isolated cases existed before. The method of propagation could never be determined.

According to the statistics given in his article, gonorrhea was more common in children under six years of age than in older ones. As to their general health, our author confirms the observations of Cohen-Brach—that it is not the feeble, scrofulous and rachitic children that are usually attacked by the disease. On the contrary, the children brought to the hospital were mostly well-developed and healthy.

Fischer confirms the statement that infantile gonorrhea varies in duration between several weeks and several months. His treatment consisted in rest in bed, baths, often with the addition of permanganate of potash, and local ablutions, with a 1 to 2 p. c. solution of zinc sulphate several times daily.

Deutsche Med. Wochenschrift.

CHLOROSIS.

Dr. Charrin advances the theory that chlorosis is a menstrual or genital auto-intoxication.

At the time when the menses are due the toxic quality of the serum is on the increase. Nursing women who menstruate notice at this period diarrhea and eruptions in their nurslings; at this period fever and herpes are not uncommon in many women; then the flow commences and everything passes away, the headaches cease, the muscular pains disappear, the appetite returns and the

symptoms of poisoning are gone.

On the other hand, experimental researches, very incomplete as yet, seem to indicate analogous conclusions.

Charrin thinks that the menstrual function purges the system of certain poisons; the genital organs, then, have an eliminative action.

If, under the influence of heredity, of scrofula, of tuberculosis, the impoverished tissues are insufficiently developed, this lack of development affects the genital organs equally with the others; they fulfill less admirably their duty of elimination.

On the other hand, during the first years, the amount of body waste is small; at puberty it increases rapidly.

At this period the imperfection of the undeveloped cells becomes evident; the products of the metabolism augment suddenly, and are badly eliminated; there, then, is a first cause of auto-intoxication, for it is well known that the more these products are metamorphosed or oxidized, the less injurious they are.

The small calibre of the mesenteric and pulmonary arteries adds to the imperfection of these exchanges.

To these general causes of auto-intoxication comes now another and characteristic factor—the obstruction of the depurative genital outlet, which cannot carry off the toxic substances destined to be eliminated this way.

—Gazette Hebdomadaire.

TUBERCULOSIS AND POVERTY.

Dr Leon Petit says that if two maps of Paris were prepared, one showing the poorest part of the city, and a second representing those wards (arrondissements) where tuberculosis is most prevalent, we should find that one was nearly identical with the other.

The rich wards—8th, 9th, 16th—are those in which the fewest cases of tuberculosis are to be found.

The poorest wards—13th, 19th, 20th—are those where phthisis is most prevalent.

How many deaths from tuberculosis are there yearly?

In the 13th ward (the poorest)...812

In the 8th ward (the richest)...178

It is the duty of the municipality to alleviate, as far as possible, the effects of poverty. Considerable may be done; the example of Budapesth is here very much in evidence.

The capital of Hungary, which is growing with the rapidity of an American city, has attracted from all quarters of the country many social elements that are miserably poor. These new-comers, destitute of the most elementary notions of hygiene, are in the utmost destitution.

For some years the authorities have endeavored to improve the state of things.

Results have not been wanting. From 1884 to 1888 phthisis carried off 640 of every 100,000 inhabitants; from 1889 to 1893 this figure had fallen to 500.

—Bulletin mensuel, etc., Jan., 1896.

INTRAVITAL SOFTENING AND FORMATION OF CAVITIES IN THE SUPRARENAL CAPSULES.

PROF. M. V. ODENIUS, OF LUND.

Eustachius discovered the suprarenal capsules and gave them the name of "glandulae quae renibus incumbent;" Casserius called them "renes succenturiati;" Caspar Bartolinus (1641) describes them as being hollow and containing a dark fluid. He thought that these organs were the probable place of formation of the "atra bilis," and, therefore, gave them the name of "capsulae atrabiliariae."

Subsequent anatomists seem to have considered that the presence of a cavity in the suprarenal capsules was a normal condition and several of them, Valsalva particularly, tried to find an efferent duct. Heller found in most cases a "vera cavea," but was inclined to regard this more as an intracapsule than as a cavity with its own walls.

In the beginning of this century Meckel (1820) advanced the following opinion that has a great similarity

to the modern idea. Virchow, Henle and Orth consider it to be a post-mortem change. Author is of the opinion that the cavities may form during life and brings two cases to support his views.

—Nordiskt Med. Arkiv.

Professor Roentgen was summoned to Berlin by the German Emperor, who desired to hear of his wonderful discovery. After the conference, he was made a Knight of the Order of the Crown.

—Progres Medical.

Which translated into American means that William II gave him the third-class decoration of a third-class order for a discovery that is of inestimable value to science.

Had Professor Roentgen written his name with a "Von" and been colonel of a regiment of soldiers, he would not have been treated so shabbily, but a man of science and a commoner—bah!

LITHIUM BROMIDE IN INFLAMMATION OF THE KIDNEYS.

(From Medizinische Novitaten.)

Dr. Polakow has had excellent results from the use of this drug in 22 cases. Part of these were suffering with acute and part with chronic parenchymatous nephritis. Bromide of lithium was, in his hands, a safe and powerful diuretic, reduced the amount of albumin and caused often disappearance of the edema, and this while having a mixed diet and following no other plan of treatment.

Professor Hajak, of Vienna, has declared that smokers are less liable to diphtheria and other throat diseases than non-smokers in the ratio of 1 to 28. The learned Dr. Schiff also gives us to understand that smoking is always positively forbidden in bacteriological laboratories, because it is known to hinder the development of the bacteria.

The action of the drug was more pronounced in acute than in chronic cases, and acted well in three cases of puerperal nephritis as well as in one of the puerperal eclampsia.

[Rp. Lith. brom. 1.5
Sodii bicarb. 4.0
Aqueae dest. 240.0
Tr. menth. pip. 2 drops.
Take three-fourths tablespoonful daily.
—Aertzi Rundschau.

RAPID AND SURE DISINFECTION OF INSTRUMENTS.

Porth (Deutsche Militararztl Zeitschrift) says that all instruments may be perfectly cleaned and rendered aseptic by covering them with collodion and then removing this with acetic ether.

—Deutsche Med. Wochenschrift.

TETANUS.

Dr. L. Oscherowski reports a case of tetanus cured by subcutaneous injections of carbolic acid. The tetanus was caused by a gunshot wound of the leg. On the sixth day in the hospital light trismus; on the tenth day, very severe trismus; on twelfth day, general convulsions and tetanic twitchings. Morphine, opium, chloral had absolutely no effect; spasms increased in frequency and death was expected. On twentieth day injections of a solution of 0.6 acid carb. in 30.0 aqueae dest., 12 minims, every three hours. Two days later, improvement. On thirty-fifth day patient was discharged cured. Twenty-eight injections were given.

—Petersb. Mil. Med. Journal.

TROUBLES IN THE COMMUNITY.

The coal dealer dies of colitis;
The twine-maker had the chord-ee;
The farmer's attack of oat-itis
And rye-neck was painful to see;
The wheelman went blind with cyclitis,
The bridge-builder suffered from piles,
The servant girl had Sal-pingitis,
And the cook was all covered with b'iles.

—Southern Med. Rec.

Current Surgical Literature.

T. H. MANLEY, M. D., New York, Editor.

HOT WATER IN SURGERY.

Most people drink too little water. Five pints daily is the normal quantity required for flushing the system and preserving health. If every adult would drink two or three quarts every day many other troubles besides constipation, indigestion, catarrh, insomnia and nervousness would be overcome and prevented. It is the diluent and cleansing properties of the water drunk at mineral springs, quite as much as the contents, that is the health-restoring influence which works such marvels upon the chronic invalids who resort thither.

Swollen and inflamed parts subside under the use of hot water applied as a poultice; in fact heat and moisture are the only elements of virtue in poultices.

Insomnia is more relieved by a hot bath on going to bed—even in the hottest weather—than by any other remedy.

A foul or riotous stomach, or an obstinate case of retching after anesthesia, or during pregnancy, will always receive kindly and retain a glass of very hot water sipped gradually, when nothing else can be tolerated.

In gynecology hot water injections 120 degrees Fahrenheit, are now recognized as a most important remedial agent in the treatment of acute and chronic inflammation of the internal female sexual organs, administered with a syringe that can fill the expanded vagina to its capacity to hold it and retaining it there as long as possible.

Hot water applications, externally or internally, to hemorrhoids we all know to be followed by excellent results in relief of distress and suffering. They are also of inestimable value in impaction of the bowels, in fevers, in constipation, also in the

pain, itching, tenesmus and sphincter contraction resulting from hemorrhoidal turgescence.

In short there is no remedial agent known to modern medicine and surgery that equals hot water in its good effects upon the system; but its simplicity, cheapness and availability lessen its value to many unthinking people who would appreciate it more highly if it could be bottled up and sold at a high price under its true appellation "the Elixir of Life."

—Journal of Orificial Surgery.

SURGICAL DISEASES OF CHILDREN.

The subject of the radical cure of hernia in children continues to receive much attention. Both as regards the selection of the most suitable for operation and the relative advantages of the different methods. In the discussion at the London meeting of the British Medical Association, the consensus of opinion was in favor of operation in children of more than one year old, when any difficulty occurs in the retention of the hernia with a truss. Among the many practical points insisted upon by the different speakers in the management of hernia in childhood were the careful regulation of the diet, the treatment of phimosis by circumcision, and the advantages of the simple Berlin-wool truss in infants under nine months old. Macewen's operation was especially advocated, and as far as practicable the recumbent position for several weeks afterwards was advised. Schonfeldt (*Archiv für Kinderheilkunde*, 1895, p. 66), after a full consideration of the subject, comes, amongst others, to the following conclusions regarding operations for inguinal hernia: 1. In all reducible hernia an attempt should be made to bring about a cure by the

use of a light truss. 2. The association with ectopia testis may render the use of a truss impossible and be an indication for operation. 3. Operation should be performed in cases of very large scrotal hernia, and in all cases in which considerable difficulty is met with in the treatment with a truss.

—Practitioner, Jan. '96.

CONTRIBUTION TO THE STUDY OF ADENOID VEGETATIONS.

—From the Journal of Laryngology.
Dr. Y. Arslan, Padua.

Amongst 4080 patients suffering from affections of the nose, throat, or ear, 426 had adenoid tumors in the naso-pharynx. Of these, 69 per cent. presented symptoms of nasal obstruction, 37 per cent. suffered with tonsillitis or pharyngitis, 59 per cent. had ear complications, of whom 110 were cases of suppurative otitis, and 142 were cases of deafness without suppuration. Amongst six deaf mutes affected with adenoid vegetations, two were benefited by their removal. Other complications were noted, such as bronchitis, laryngeal spasm, night terrors, stammering, nocturnal enuresis, and convulsive attacks. A case of Jacksonian epilepsy, thought to be of central origin, soon disappeared after operation. Of the 426 patients, 222 were submitted to operation. Of these, 125 were completely cured, 50 improved, and 47 were lost sight of. In only seven cases was a second operation called for.

From these complete statistics I am able to draw some conclusions both as to etiology and treatment. patients I was able to note traces of hereditary. Dampness and other causes were of secondary importance. As regards direct complications, the operation is certain in its benefit. For reflex complications, the result is not so positive. It is advisable to operate even when the hypertrophied masses are of small dimensions. With a little patience, posterior rhinoscopy can be carried out in at least 74 per cent. of the

cases. Disappearance does not always take place with age, for the growths were found in patients whose ages varied from 20 to 40.

Treatment consists in complete removal of all the hypertrophied masses. The operation should be completed at one sitting, so as not to expose the patient more than once to the consequences of an operative procedure, even although this is of no great moment. As already remarked, of the 222 cases treated, only once was it necessary to repeat the operation.

General narcosis should be employed, otherwise a simple operation is rendered complicated, long, and brutal, especially as the minority of our patients are children, in whom it is useless to expect complete docility. Besides, we require muscular relaxation of the mouth, palate, and naso-pharynx, in order to be able to work satisfactorily. The employment of cocaine is insufficient. Of the various anesthetics, I give the preference to bromide of ethyl, which is, for short operations, incomparably superior to chloroform and ether. Indeed, bromide of ethyl is rapid and certain in its action; it is harmless in the dose employed (10 to 20 grammes); it leaves no disagreeable consequences. The patients are able to return home afterwards by themselves, and they have neither vomiting, headache, nor malaise.

A CASE OF SPINIA BIFIDA OCCURRING IN THE CERVICAL REGION.

The unusual occurrence of spina bifida in the cervical region may be of interest to some of your readers, and so form an excuse for my encroaching on your valuable time and space.

On June 19, 1895, I attended Mrs. B. in her first confinement, when she was delivered of a full-term female child, the labor being abnormal. At the birth of the child I noticed on the back of the neck a tumor which was about the size of a tangerine orange, slightly constricted at its base and depressed at its summit;

the skin covering the tumor was normal, and plentifully covered with hair at the base, but became thinner as it spread over its surface, and at the apex was thin, glistening, and bluish-white in color, and much wrinkled; the tumor could be emptied of its contents by pressure. The child died 12 hours after its birth. During its short period of life it had (the nurse informed me) several fits, the characteristics of which I am unable to describe, as I did not happen to be present at any of the attacks. I had the opportunity of making a post-mortem examination, and found the following conditions: The tumor communicated with the interior of the skull by passing through the foramen magnum and an opening in the neural arch of the atlas. The foramen magnum did not appear to be unusually dilated, the neural arches and formation of all the other cervical vertebrae being normal; neither was there any abnormality of the occipital bone, the torcular Herophili and the sinuses being complete. Spina bifida of the lumbosacral region is fairly common, but becomes rarer the higher the situation. In the Museum of the Royal College of Surgeons, amongst the specimens of the malformation, there is a specimen of a ligatured spina bifida occurring at the sixth and seventh cervical vertebrae; but I can find no record of a case occurring above this position, except accompanied by hydrocephalus or considerable malformation of the skull. In this case there was no other abnormality in the skull or elsewhere.

Robert Edwards, M. R. C. S., L. R. C. P., in the British Medical Journal.

CONTRIBUTION TO THE STUDY OF A FORM OF HEMATURIA OF TUBERCULAR ORIGIN IN THE KIDNEY.

By H. M. Aubinsaw, in These de Paris,
December, 1895.

Hematuria is a frequent symptom of renal tuberculosis; in fact it is often the first symptom.

It is characterized by its sponta-

neous onset, its short duration—usually from three to four days—frequent relapses and increasing intensity.

The author has quoted freely from MM. Rontier, Pousson, Tuffier, Czerny and Alberan. This type of hematuria may sometimes be so abundant as to greatly exsanguinate the patient.

The author states that the presence of Koch's bacillus removes all doubt in diagnosis, but its absence does not always prove that tuberculosis is not present.

Hemorrhage from calculus is easily excluded, because movement of the body does not aggravate it. In hematuria of a malignant origin blood seldom escapes over a long period without the presence of a tumor being made manifest. In the hematuria of tropical climates the presence of the *filaria hominis sanguinis* will exclude tubercular disease.

The greatest difficulty is met in differentiating these conditions attended with hematuria, first described by Lancereaux, as of a nervous origin. Senator has described a hematuria of a constitutional origin in hemophilia, or bleeders.

The author recognizes two sources of infection in this malady; one through the blood and the other through the urinary passages.

The hemorrhagic form of renal tuberculosis is always a serious form, which may render a nephrectomy an operation of urgency.

When the bleeding is moderate we may strive to arrest it by palliative measures. The author concludes his valuable paper as follows:

1. That tubercular disease of the kidney is primary and unilateral.
2. That tubercular disease of the kidney may first manifest itself by a copious hematuria.
3. The abundance and frequency of hematuria may necessitate a nephrectomy.
4. When indications point with certainty to extensive disease of the kidney, it should be removed in order to avoid the risk of general infection.

TUMORS OF THE SUPERIOR MAXILLARY.

By M. Hammer, Gazette hebdomadaire de Med. et de Chir.

The author bases his report on 22 cases which he has treated. He says that these growths are often very insidious in their onset. So latent that they may be far advanced before the patient is aware of their presence. They commonly commence in cavities quite inaccessible to exploration, and are only manifest when they begin to encroach on the skin or mucous membrane.

In all those cases in which we suspect a deep-seated tumor of the superior maxillary, we should carefully explore the nasal passages, the vault of the palate, the pharynx and post nasal space. When the configuration has altered and the osseous walls impinge, we will find by the use of the needle that the bone has become more vascular and is much more friable than normal.

From the prognostic point of view those sarcomata with small cells are the most malignant; those with intermediate, hyaline substance are less so; the fibro-sarcoma with giant cells the least. The endotheliomata progress slowly and often undergo cystic changes, and are but slightly malignant. Epitheliomata here are no less malignant than sarcoma.

TREATMENT OF CANCER OF THE STOMACH.

By Queen, Revue de Chir., No. 10, 1895.

If cancer is seated at the pylorus an exploratory laparotomy may be immediately followed by an extirpation of the neoplasm.

Sometimes, in some varieties of disease, where there is much infiltration into surrounding organs an excision is not justifiable. In some forms, although removal of the growth is impracticable, the stenosis which it produces may make a gastroenterostomy desirable. The operator ad-

vises this procedure to be effected in two operations. In all cases of operations on the stomach it is of the greatest importance that they be performed rapidly, and all precautions be observed to provide against a considerable loss of blood.

THE TREATMENT OF CARBUNCLE.

Quite twenty years ago Sir James Paget published his now classical lecture on this subject, in which he stated that "cases uncut heal more readily than those cut;" and further, that "carbuncles, if not divided, not infrequently suppurate only about their centres and slough only in their central parts, and the borders clear up by the softening and dispersion of the inflammatory product in them. In some cases they completely abort." It is my belief that, if seen before the softening takes place, resolution can generally be effected by pressure combined with the application of iodine, and that in any case this plan of treatment gives the best results obtainable. Iodine is, of course, a very old remedy, and has, I fancy, fallen into disrepute through an error in its mode of application. The weak tincture has been used instead of the strong liniment. It has possibly been somewhat the same with regard to pressure, for we are told in Holmes' "Surgery" that "the treatment by pressure (with plaster), as Dr. O'Ferrall prescribed, has fallen into disuse." It is doubtless in very many cases difficult to apply pressure effectively, but when the carbuncle occurs on a limb I can confidently recommend the following treatment: Paint the carbuncle and the skin immediately surrounding it freely with iodine liniment, and over this place a thick pad secured firmly by means of an elastic bandage. The immediate relief this gives is very marked, and the patient is able to go about his business as usual.

—Dr. Maberly in Brit. Med. Jour.

Miscellany.

Dr. John S. Billings, late Deputy Surgeon General, United States army, on the evening of November 30 was presented with a check for \$10,000, duly inclosed in a silver box, bearing the following inscription: "From 259 physicians of the United States and Great Britain, in grateful recognition of services to medical scholars." The services here alluded to was the completion of the Index Catalogue of the Library of the Surgeon General's office, Washington, D. C.

—Atlanta Med. Jour.

The Consolidated Library of New York—consisting of the Astor, Lenox and Tilden libraries—has succeeded in securing the services, as librarian, of Doctor Billings, who is one of the best bibliographers in the United States. As the Consolidated Library is the largest in North America (numbering about 375,000 volumes), with property and endowments amounting to \$8,000,000, there is certainly a great future before it under such distinguished management.

MEDICAL EXAMINERS' FEES.

Our esteemed contemporary, Puck, has a very striking cartoon, apropos of the Holmes case, upon the subject of insurance companies and their employees. The point of the cartoon is that these companies are so eager to insure everybody and to make money that they are careless in their methods and secure cheap and incompetent men as their agents. The recent general cut in the prices for medical examiners' fees we have already spoken of, and stated that it was, we presumed, a purely business matter, and if they, the companies, could get good men for a lower price they had the right to do so. But, in the light of recent events, it seems that it is not likely they can

get good men. Insurance companies had better try and economize in some other way than by cheapening the price paid to their agents for careful examinations of people that are to be insured.—N. Y. Med. Record.

AMPUTATION IN TETANUS.

Four cases of tetanus are reported in the Journal of the Academy, and the article is summed up in the following words: Amputation practiced in the healthy tissue puts the patient in the best condition for the cure of traumatic tetanus. In cases where it can be done without too extensive mutilation it should be resorted to with as little delay as possible—after the first symptoms. When, from injury, the vitality and proper function of a limb are compromised and the question of amputation arises, the appearance of tetanus should turn the balance in its favor.

VERMINOUS PERFORATION OF THE INTESTINE.

M. Rohmer presented specimen of intestine of a child, who was suddenly seized with a colicky diarrhea, quickly followed by death. On autopsy, the small intestine in several places was proved the seat of several small openings, in each of which a large lumbricoid was found engaged. The author found no evidence of pre-existing disease in the mucous lining of the bowel, and hence believes that the worms by their own action had pierced their way through.

M. Spillman took issue with this view, and declared that it was only when pathological conditions had led to intestinal perforation, that lumbricoides could make their way out into the cavity of the peritoneum.

Current Literature in Obstetrics and Gynecology.

E. D. KINNEY, M. D., Boston, Editor.

STATISTICS OF VAGINAL HYSTERECTOMY FOR UTERINE CARCINOMA.

Schmid (*Centralblatt für Gynäkologie*, No. 43, 1895), reports the results of forty-two cases where vaginal hysterectomy was performed for carcinoma. Thirty were carcinoma of the cervix, seven carcinoma of the corpus uteri, and two a carcinomatous degeneration of myoma. Up to 1892 he had operated upon thirty-four cases, with the following results: Seven died through operation; seven are free from return of the disease, twelve have a return, and eight failed to answer his communication.

—University Medical Magazine.

DIGITAL EXPLORATION IN MIDWIFERY.

Crouzat (*Revue Obstétrique Internationale*), October 21, 1895, disagrees with certain German obstetricians who oppose digital exploration in normal labor and rely upon abdominal palpation. The diagnosis of normality may demand the introduction of the finger into the vagina. Crouzat's principles simplify digital exploration and guard against its dangers. Vaginal examination, he thinks, should be made as rarely as possible. One exploration at the beginning of labor and another immediately after the rupture of the membranes are usually sufficient. It is his practice to make the external parts antiseptic; the hands and forearms are then washed and brushed thoroughly. The nails must receive special attention. The washing is afterwards repeated in a 1:1000 bichloride of mercury solution. Great care in the introduction of the forefinger is strongly advocated. This should be dipped in sublimated vaseline and guarded by

the thumb and other fingers, whilst the hand is passed under the clothes and near the patient's thighs. On reaching the perineum the labia are parted by the thumb and middle finger. The forefinger is lastly introduced into the vagina without having touched any part of the patient or her clothes since the time it was made septic.

—Union Med. Magazine.

THE MANAGEMENT OF MISCARRIAGE.

Dr. George C. Barton, in a paper read before the Hennepin County Medical Society, said: Two methods present themselves, one being what is called conservative and the other the active plan of treatment. He discussed the two methods, and gave the reasons for his conviction as to which is the better. The two plans briefly stated are these: The one is to allow the placenta to remain and come away as best it may, and the other is to forcibly remove the afterbirth, completely emptying the uterus of all the secundines. In the first method of treatment a foreign body is left in the uterus which is liable to become septic at any time, and when it does a woman's life is put in jeopardy, or, if she escapes with her life, her health is almost sure to be permanently injured. Not only is she in danger of sepsis, but as long as the afterbirth is retained she is in danger of hemorrhage, which may be sufficient to terminate the woman's existence. In France this method is followed to a considerable extent. Tarnier is one who advocates it strongly, claiming that the womb should be allowed time to expel its contents. He points out hospital statistics in which he saw for-

ty-six cases of retained placenta after abortion and only one death, and that from pneumonia; but the death rate at a hospital in Florence, in which Tarnier's plan of treatment seems to have been carried out, shows a mortality of six per cent. Tarnier and Cazeau report a case as follows: "During the first five days the patient did very well, but on the sixth, and at 3 o'clock in the afternoon, a violent chill came on, which lasted an hour. This unfortunate lady died on the tenth day." All the advocates of this so-called conservative plan of treatment agree that in case there is any indication of sepsis, or even before that, when the lochia becomes offensive, the uterus should be emptied. The only dangers he can conceive of in the active plan of treatment are the introduction of septic material by the physician, which is inexcusable, and the danger of perforation of the uterus by the use of the curette. He is inclined to believe that, in many of these cases the curetting did not immediately follow the abortion, but was done to remove a decomposing placenta in a softened uterus. Granting that there have been accidents, the percentage of mortality from this cause is small as compared with the percentage of mortality in retained placenta. In the latter plan of treatment it is not only the death rate, but the injury to health that should count against it. We may have, as a result of a retained after-birth, septic endometritis and salpingitis, with pyosalpinx; we may have uterine phlebitis; we may have septic phlebitis of one or both legs; we may have septic peritonitis or septic pneumonia or septic pleurisy, and many other conditions to which the absorption of septic material gives rise. This, together with the danger of a fatal hemorrhage, which is constantly present in a retained placenta, is, when set over against the fact that a few women have lost their lives by the uterus being perforated with the curette in the active, or radical, method of treatment, it seems, sufficient to decide the question in favor of the active method.

—The Med. Bulletin.

HYDROCELE OF THE LABIUM MAJUS.

According to Edwards, a prolongation of peritoneum may reach below the mons veneris through the inguinal ring, covering the round ligament. This peritoneal investment may become adherent above the ring, and a transudation of serum occur into the cavity formed. This condition is then known as hydrocele of the labium majus. He gives several varieties: 1. That in which there exists a patulous canal of nuck. The fluid is excreted from the peritoneal surfaces covering the ligament and is free to return within the general peritoneal cavity. 2. The sac may be entirely cut off from the abdominal cavity and dropsy occur in this closed sac. 3. The cellular tissue of the labium majus consists of two layers, which are prolongations of the superficial abdominal fascia. These two layers are considered the analogue of the dartos tunic, and between them a serous tumor may form. This is considered by some to be true hydrocele in woman. 4. The substance of the round ligament itself may be the site of a cyst. The gubernaculum of Hunter in the fetus becomes the round ligament in the female. This fetal structure is at first hollow, and there may be a persistence of this fetal condition which allows the formation of a cyst. Eisenhart has collated forty-eight cases of hydrocele in the female, and finds that twenty-nine were upon the right side and nineteen upon the left; he considers traumatism and congenital defect to be the most frequent causes. Smith believes that the disease is not so rare as is stated; during a period of four years he says, five cases have been operated upon in the Tottenham Hospital. The treatment of hydrocele feminina is operative. Expose the cyst by a linear incision, ligate the neck and enucleate. The wound is to be closed by superimposed layers as in the closure of hernia. Simple puncture of the hydrocele is of little avail.

—American Journal of Obstetrics, etc.

Prescriptions.

Alopecia after Fevers.—

R Alcohol $6\frac{1}{2}$ dr.
 Veratrini $7\frac{1}{2}$ gr.
 Tinct. benzoin 15 drops.
 Acid salicyl $6\frac{1}{2}$ grs.
 M. S.: Apply locally.

—Kaposi.

Pruritus from Jaundice.—

R Ichthylol 10 parts.
 Spts. vin. rect. dil. 40 parts.
 Ether 40 parts.
 M. S.: Apply locally.

Sycosis.—Apply two or three times daily as a wash with a cotton tampon a one per cent. solution of corrosive sublimate in ninety-five per cent. alcohol. To allay the irritation which may be produced cover at night with an occlusive ointment such as that of Hebra.—Tile, Bul. Med.

Nutritive Enema.—

R Water 150 grams.
 Dry peptone 10 grams.
 Yellow of one egg.
 Glucose 20 grams.
 Sydenham's laudanum 4 drops.
 —Tournier, London Med. Times.

TO AVOID IODISM.

Hardaway claims that the continued use of the following mixture does not produce iodism:

R Potassium iodide $\frac{1}{2}$ to 1 oz.
 Ammonia-citrate of iron 2 dr.
 Tinc. nux vomica 2 dr.
 Water $1\frac{1}{2}$ oz.
 Compound tinct. cinchona 2 oz.
 One teaspoonful in water after meals.
 —Med. Weekly.

TAR FOR HEMORRHOIDS.

The following mixture, applied night and morning to the nodule, will effect a cure in from four to twelve days:

R Wood tar 3 parts.
 Extract of belladonna 3 parts.
 Glycerine 30 parts.
 Rev. de Ther. Med. Chirur.

Therapeutical Progress.

BRIEF NOTES ON NEW AND RARE REMEDIES.

From the American Druggist.

CRESALOL. — (Ortho, meta, and paracresol salicylates.) White bulky crystalline powders resembling salol. Insoluble in water, readily soluble in A., E., slightly in oils. More powerfully antiseptic than carbolic acid, though less poisonous and milder in physiological action. Intestinal antiseptic (para- the one most commonly found in shops), vesical catarrh and articular rheumatism. Dose 1 to 2 drs. daily in divided doses. Also applied externally like iodoform.

CRESOL IODIDE.—Very light, yellow powder, with disagreeable odor; readily soluble in A., E., C.

and oils. Insoluble in water. Adheres to hands, instruments, etc., like resin. Antiseptic, allaying inflammation in nasal diseases.

CRESOLS.—Higher homologues of phenol. More actively antiseptic and less poisonous. See trikresol.

CRESYLAL.—See Trikresol.

CROTON - CHLORAL.—See butylchloral hydrate.

CUTAL.—(Aluminum borotannate.) Light brown powder, insoluble in W., soluble on addition of tartaric acid. Contains tannin 76, aluminum 13.23, boric acid 10.71. Astringent antiseptic, externally Gonorrhea, etc.

DATURINE, ALKALOID.—From *Datura stramonium*. Probably identical with hyoscyamine. The sulphate is usually employed.

DERMATOL.—(Bismuth sub-galate.) Odorless, stable, light yellow powder. Antiseptic siccative, vulnerary. As dusting powder, on wounds, ulcers, etc., in ointment or on gauze. Also intestinal antiseptic. Dose 30 grs. daily.

DESINFECTOL.—Analogous to Creolin.

DIABETIN.—Levulose, invert sugar. Recommended as a substitute for cane sugar in diabetes.

DIAMINE.—(Hydrazine.) Small colorless crystals, analogous to hydroxylamine hydrochloride, powerful reducing agent, poison to life of all kinds. Destroys mold, germs, bacteria, etc.

DIAPHATHERIN.—(Oxyquinaseptol.) Bright yellow powder, readily soluble in water. Non-toxic antiseptic application (1 per cent. solution) in wounds and purulent discharges in affections of the nose, ear, mouth, etc.

DIAPHTHOL.—Yellowish white crystals, slightly soluble in water. Non-toxic antiseptic.

DIGITALIN, GERMAN.—(Digitalin, Fr.) Not to be confounded with the French. White powder, freely soluble in water, dil. A, insoluble in strong A, E, C. Heart tonic, slows the heart beats, anti-aphrodisiac, diuretic. Dose 1-64 to 1-32 gr., 3 or 4 times daily. Max. dose single 1-16 gr., daily 1-3 gr. Antidotes, tannin, nitroglycerin, later strophanthus.

DIGITALIN, FRENCH.—Not to be confounded with the German Digitalin, which see. Occurs in two forms, crystalline, and as an amorphous yellowish white powder, the latter being official in the French codex. Indications the same as for the German, but used in smaller doses. Dose 1-240 to 1-64 gr. 3 or 4 times daily.

DIGITALEIN, SCHMIEDEBERG.—Pale yellow amorphous powder, said to combine the properties of digitalin and digitoxin. Readily soluble in water and A.

DIGITOXIN.—The most poisonous of the glucosides of digitalis. In-

soluble in water, soluble in C, white tufts of acicular crystals. Dose 1-200 to 1-100 gr. daily.

DI- IODOFORM.—(Ethylene Periodide, Tetra-iodo-ethylene.) Yellowish white needles, almost odorless, decomposed by light. Insoluble in water, sparingly, soluble in A, E, very soluble in C, benzene. Contains 95.28 per cent. iodine. Substitute for iodoform.

DIPHTHERIA ANTITOXIN.—(Diphtherine, etc.) Product of metabolism in blood serum, in the organism under the influence of diphtheria toxin. By intravenous injection either as prophylactic or therapeutic. Limpid liquids. Must be kept sterile and aseptically injected under the ribs, in the loins or the inner surface of the thighs. Various prices on application.

DITHION.—Mixed sodium salts of the two dithiosalicylic acids. Used by veterinarians in 5 per cent. solutions for irrigating wounds, as dusting powder or as 10 per cent. salve in harness sores, erysipelas and strangles. Excellent prophylactic in foot and mouth disease. Dose, 6 to 14 drachms mixed with the food.

DIURETIN.—(Sodio-theobromine Salicylate.) White powder of saline taste. Soluble in 1-2 hot water, remaining in solution on cooling. Contains 49.7 per cent. theobromine and 38.1 per cent. salicylic acid. Protect from the air. Diuretic, strengthening instead of depressing the heart. In dropsy, hepatic cirrhosis and various diseases of the heart and kidneys accompanied by edema. Dose, 15 to 20 grains 4 to 5 times a day. Incompatible with acids or alkalis.

DUBOISINE SULPHATE.—Yellowish hygroscopic powder. Cardiac and respiratory stimulant, mydriatic, sedative. More rapid and less irritant than atropine as a mydriatic. Applied in 1 or 4 to 500 solution. Dose, 1-320 to 1-60 gr.

DULCIN.—(Sucrol, Para-phenetol-carbamid.) White crystalline powder, soluble in 800 water, 25 A. Decomposed on prolonged boiling. 250 times sweeter than sugar; no untoward effects.

For Physicians' Wives

HINTS FOR HOUSEWIVES.

White lace and muslin curtains can, with a very little trouble, and at trifling cost, be tinted a delicate shade of ecru, pale pink, heliotrope or green by using colored starches.

* * *

To remove iron-mold stains from linen a little oxalic acid should be dissolved in water, and the stained part dipped in the solution, when the iron-mold will be found to disappear without injury to the fabric. The mixture may be kept in a bottle for any length of time, but it should be distinctly labeled, as it is a strong poison.

* * *

To remove paint from clothing, saturate it with turpentine until softened, and then wash out with soap and water.

* * *

Strong tepid soda water will make glass very brilliant.

CONCERNING EGGS.

Pour boiling water over frozen eggs and let them remain until the water is cold; they will then beat nearly as well as fresh eggs. Keep them frozen hard until ready for use.

To determine the age of eggs, dissolve a quarter of a pound of salt in a quart of cold water, and drop the eggs in one at a time. If a day old an egg will settle to the bottom; if three days old, it will float; if more than five days, it will rise above the water in proportion to its age.

To ascertain the quality of eggs, make a cone of stiff white paper, place the eggs to be tested, one at a time, in the large end and look through the small end toward the sun. If the contents look clear, the egg is good, though the shell may be discolored; if spots are seen it is not good.

Water forms about 70 per cent. of a fresh egg. This begins almost immediately to evaporate through the pores of the shell, and the air entering introduces bacteria, which causes the contents to deteriorate and in time to decompose. Place new-laid eggs in a wire basket, and immerse the basket five seconds in boiling water. A very thin coating of coagulated albumen is thus formed next to the shell; the pores can then be closed by rubbing the shell with a cloth dipped in linseed oil.

Eggs boiled twenty minutes are more readily digested than if boiled five. They are dry and mealy and more easily acted upon by the gastric juice.

The whites of eggs will froth more rapidly if very cold. A pinch of salt added helps to cool them in warm weather.

Eggs laid in March or April, if rubbed with vaseline, into which has been beaten a little salicylic acid, and packed in salt, will keep several months without perceptible deterioration.

A raw egg swallowed immediately is very effective in removing a fish-bone which has become lodged in the throat. The white of an egg is an excellent application for a burn. If mustard is mixed with the white of an egg a blister will seldom follow the application of the plaster.

Hoarseness and tickling in the throat are relieved with a gargle of the white of an egg beaten to a froth with a tumblerful of warm sweetened water.

An old but very effective remedy for an obstinate cough is to place two or three whole eggs in very strong vinegar (boiled down to increase the strength, if necessary). In three or four days the acid will have consumed the shells. Beat the mixture well and thicken with honey.

Take two tablespoonfuls before each meal.

The yolk of an egg is a very good substitute for cream in coffee, and will answer for three cups.

A raw egg beaten with a little pulverized sugar, half the quantity of cream or milk, is excellent for convalescents or elderly people. Very sick people can sometimes eat the yolk of a hard-boiled egg when the white cannot be eaten with safety.

The skin of a boiled egg, moistened and applied to a boil, will cause supuration and relieve soreness in a few hours. It is also an excellent application for a sty or inflamed eyelids.

A plaster composed of the yolk of an egg and salt will often relieve pleurisy, kidney and neuralgic pains.

—Albany Cultivator.

REMEDIAL FOODS.

Celery is invaluable for those suffering from any form of rheumatism, for diseases of the nerves and nervous dyspepsia.

Lettuce for those suffering from insomnia.

Watercress is a remedy for scurvy.

Peanuts for indigestion. They are especially recommended for corpulent diabetics. Peanuts are made into a wholesome and nutritious soup, are browned and used as coffee, are eaten as a relish simply baked, or are prepared and served as salted almonds.

Onions are almost the best nerve-vine known. No medicine is so useful in cases of nervous prostration, and there is nothing else that will so quickly relieve and tone up a worn-out system. Onions are useful in all cases of coughs, colds and influenza; in consumption, insomnia, hydrophobia, scurvy, gravel, kidney and liver complaints. Eaten every other day they soon have a clearing and whitening effect on the complexion.

Spirach is useful to those with gravel.

Asparagus is used to produce perspiration.

Carrots for sufferers from asthma.

Turnips for nervous disorders and for scurvy.

Raw beef proves of great benefit to persons of frail constitution, and to those suffering from consumption. It is chopped fine, seasoned with salt and heated by placing it in a dish of hot water. It assimilates rapidly and affords the best nourishment.

Eggs contain a large amount of nutriment in a compact, quickly-available form. Beaten up raw with sugar they are used to clear and strengthen the voice. With sugar and lemon juice the beaten white of egg is to relieve hoarseness.

Honey is wholesome, strengthening, cleansing, healing and nourishing.

Fresh ripe fruits are excellent for purifying the blood and toning up the system. As specific remedies, oranges are aperient. Sour oranges are highly recommended for rheumatism.

Cranberries for erysipelas are used externally as well as internally.

Lemons for feverish thirst in sickness, for biliousness, low fevers, rheumatism, coughs, colds, liver complaints, etc.

Blackberries as a tonic. Useful in all forms of diarrhea.

Tomatoes are a powerful aperient for the liver, a sovereign remedy for dyspepsia and indigestion. Tomatoes are invaluable in all conditions of the system in which the use of calomel is indicated.

Figs are aperient and wholesome. They are said to be valuable as food for those suffering from cancer; they are used externally, as well as internally.

Apples are useful in nervous dyspepsia; they are nutritious, medicinal and vitalizing; they aid digestion, clear the voice, correct the acidity of the stomach, and are invaluable in rheumatism, insomnia and liver troubles. An apple contains as much nutriment as a potato in a pleasanter and more wholesome form.

Grapes dissolve and dislodge gravel and calculi, and bring the stomach and bowels to a healthy condition.

Pie plant is wholesome and aperient; is excellent for rheumatic sufferers and useful in purifying the blood.